Middle Creek CTs

ENVIRONMENTAL ASSESSMENT
EA: OR125-00-22

Umpqua Field Office
Coos Bay District
Bureau of Land Management

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Chapter 1 - Purpose of and Need for Action

The Umpqua Field Office has recently reviewed its Forest Operations Inventory, aerial photos and field stand exam information in the Middle Creek subwatershed which indicate that approximately 2700 acres of 30 to 60 year old timber stands in the General Forest Management Area (GFMA) and Riparian Reserve (RR) land allocations could benefit from commercial treatments such as thinning the conifer stands, and converting the red alder stands to conifer.

The purpose of this Environmental Assessment (EA) is to analyze the effects of harvesting timber from this analysis area and the actions associated with the harvesting activities, such as road construction and the modification of forest habitat.

This EA addresses site specific, direct, indirect, and cumulative effects of this proposal. This EA is tiered to the *Final Coos Bay District Resource Management Plan/ Environmental Impact Statement* (RMP FEIS) and its Record of Decision (RMP ROD) (BLM 1995) which is in conformance with the Northwest Forest Plan (NFP) *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-successional and Old Growth Forest Related Species Within the Range of the Northern Spotted Owl* (NFP FSEIS, Interagency 1994), its Record of Decision (NFP ROD), and it Standards and Guidelines (NFP S&G's) (Interagency 1994). This EA is also in conformance with the *Record of Decision and Standard and Guidelines for Amendments to the Survey and Manage, Protection Buffer, other Mitigating Measures Standards and Guidelines* (S&M ROD and S&G) (USDA-USDI 2001).

These documents are available for review at the Coos Bay and North Bend Public Libraries, the Coos Bay District Office of the BLM, the Coos Bay District's Internet Home Page at http://www.or.blm.gov/coosbay, and the Oregon State Office of the BLM in Portland, Oregon.

The analysis file for this EA, contains such things as Interdisciplinary team meeting notes, public input, and specialists' reports. It is hereby incorporated by reference and located at the Coos Bay District Office.

Management Objectives

Objectives:

1. Improve General Forest Management Area (GFMA) stand structure by thinning out excess trees in dense stands to enhance the growth and vigor of the residual trees to provide larger and healthier trees for future management objectives.

2. Improve GFMA stand composition by converting red alder stands to conifer through regeneration harvest silviculture.

3. Improve Riparian Reserve stand structure by thinning (density management) excess trees to enhance the growth and vigor of the residual trees.

4. Restore Riparian Reserve conifer habitat by converting red alder stands in the RR to conifer stands through regeneration harvest silviculture.

5. Maintain dispersal habitat in conifer stands that currently function as northern spotted owl dispersal habitat.

6. Work towards the goals in the Middle Creek Transportation Management Objectives (TMO) by decommissioning roads which don't contribute to continued resource management. At a minimum there would be no net increase of permanent roads in the Cherry Creek Tier 1 drainage.

7. Redirect the trajectory of stands inside the RR so they would develop characteristics consistent with Aquatic Conservation Strategy objectives.

8. Develop economically feasible timber sales for removing wood products that would fund the treatments, help meet consumer demand for wood products, and help support the economy.

9. Provide for habitat restoration projects where appropriate and within the scope of BLM regulatory authority.

The NFP allocated the uses of lands for different primary purposes. The Matrix land use allocation (GFMA) is Federal land outside of designated reserves and special management areas that are available for timber harvest at varying levels. "Under the Aquatic Conservation Strategy, Riparian Reserves are used to maintain and restore riparian structures and functions of intermittent streams, confer benefits to riparian-dependent and associated species other than fish, enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide for greater connectivity of the watershed. The Riparian Reserves will also serve as connectivity corridors among the Late-Successional Reserves" (NFP S & G's p. B-13).

Proposal

The Umpqua Field Office (UFO) proposes to treat 30-60 year old stands of primarily Douglas-fir and western hemlock within the GFMA by commercial thinning (CT) and within RRs by density management thinning (DMT). The project area of approximately 2700 acres is expected to remove the suppressed, intermediate, and some of the co-dominant trees competing with each other for growing space (thinning from below). Some areas that are proposed for a commercial thinning or a density management thinning are interspersed with red alder trees that occur as alder stands, small pockets of alder, or individuals scattered throughout the stands. The individual red alder would be removed with the thinning. The stands or small pockets of alder would be converted back to conifer stands through a regeneration harvest.

In addition to the estimated 2700 acres considered for treatment within the Middle Creek subwatershed, there are other areas that could also benefit from thinning or density management thinning. These other areas, however, were not included in this proposal because they are areas that are either too small, too isolated, or are inaccessible. It is not feasible or economical at this time to plan and to layout a thinning for these areas.

Most of the units in the proposal are in the 6th field Middle Creek subwatershed of the North Fork Coquille River analytical 5th field watershed (REO No. 1710030505). A small portion of one unit lies in the North Coquille Mouth subwatershed within the same 5th field. The Cherry Creek drainage within the Middle Creek subwatershed is a Tier 1 Key Watershed as defined by the NFP. A watershed analysis has been completed for the Middle Creek subwatershed. A second iteration watershed analysis for the North Fork Coquille 5th field watershed was completed in 2001.

This proposal includes recommendations contained in the North Fork Coquille Watershed Analysis (NFC WA) (USDI BLM 2001):

- **S** Restore conifers to sites that supported conifer prior to logging and road construction that are now dominated by red alder.
- **S** Restore upland sites accessed by the Cherry Creek Ridge Road that formerly supported late-successional conifer stands that now support mixed conifer-alder or are alder dominated using a combination of alder conversions, release treatments, and thinning with underplanting of shade tolerant trees.
- **S** Storm proof the 27-11-25.1 road in a manner that directs water intercepted by the road away from stream channels and onto the forest floor, reduces the risk of catastrophic failure, and reduces the risk of chronic sediment delivery to streams while maintaining administrative access to private land in NE¼, section 24, T.27S., R11W.
- **S** On appropriate sites, manage for durable large woody material that can be recruited as in-stream structure for both hydrologic function purposes and to provide complex aquatic habitats.
- **S** On unstable lower slope locations, release of bigleaf maples, and conifers, particularly western redcedars, is desirable.
- **S** Restore the structural integrity of historic riparian vegetation through the use of tree planting, thinning, and species conversion.
- **S** Look for opportunities to decommission, reroute or improve drainage on existing or abandoned roads. Highest priority should be given to streamside and midslope roads.
- **S** To help restore summer low flow patterns, convert red alder stands that came in following harvest of conifers.

- Riparian Restoration: Use conifer release or alder conversion techniques to reestablish conifers within suitable riparian areas. Conifers have a difficult time establishing and surviving within the natural stream bank disturbance zone. Generally this disturbance zone is within 10-feet of the stream channel. Therefore, retaining no-cut buffers that are at least 10-feet wide next to the stream channel and reestablishing conifers farther back from the stream planting outside that zone should help meet short term objectives using passive restoration and long term objectives using active restoration.
- The analysis in Table DM-1 (NFC WA)shows the minimum no-treatment forested buffer needed along streams to have a width of 20-feet or a width equal to half the tree crown diameter of the streamside trees, whichever is wider. Functionally, the widest forested buffer needed to protect aquatic values is a width equal to half the height of the overstory trees on the site at the time of treatment. These buffers are zones where passive and active restoration strategies are blended to optimize short-term protection with long term restoration.

Additional information such as timber type maps, topographic maps, aerial photos and stand exams used for this assessment, are in the individual timber sale plan folders.

Scoping

The primary purpose of scoping is to identify agency and public concerns relating to a proposed project and helps define the issues and alternatives that are examined in detail in this EA. The initial scoping process consisted of an ID Team that identified potential issues that may result in the development of alternatives to the proposal. The general public was notified of the proposed project and EA through publication of the District's semi-annual *Planning Update*. Letters were sent to adjacent landowners, agencies that have requested these documents, and other interested parties on the District mailing list. Scoping information can be found in the Analysis File for this EA.

Identified Issues

Through the issue scoping process, the ID Team reviewed comments from outside agencies, adjacent landowners, and the general public. There were some minor issues, but no significant issues or issues with potential impacts that would require analysis in another action alternative. The scoping comments received were determined to be either beyond the scope of this EA, or are minor issues that could be resolved by slightly modifying individual proposed units or modifying the design features of the project.

Potential issues identified, and eliminated from further analysis

The potential issues listed below were identified through the public scoping process and inter-disciplinary team discussions. The potential issues have been resolved with individual unit design features, standard contract stipulations, and harvest operations plans:

Issue 1:

Potential hazards of operating near Bonneville Power Administration (BPA) transmission lines:
Dangerous to fall trees near lines
Fringe of trees left near the transmission lines are subject to blowdown
Decking logs or loading trucks under or near lines is dangerous
Slash burning or other fire related activity near lines can damage fiber optic lines or trip lines

Resolution:

Design units, contract language, and harvest plan with BPA guidelines as follows:
Trees with potential to fall into transmission lines would not be included in units
Fringe of trees with blow down potential would not be left near the transmission lines
Decking logs or loading trucks would not be permitted when lines are less than 50 feet from the ground.
Cable yarders or cables would not be permitted under or near transmission lines
Slash burning or other fire related activity would not be permitted under or near lines
BPA's North Bend District line foreman would be contacted prior to active harvest operations or fire activity under or near power lines.

Issue 2:

Potential to degrade road and water quality and/or quantity associated with the proposed McKinley Garage CT:

Current poor condition of the culverts and road surface of the McKinley Garage Road may worsen with proposed heavy truck and equipment use, which could impact the only access to the private property adjacent to the McKinley Garage CT project.

Proposed logging may affect a small spring at one of the curves in the road just before the road crosses into the private property

Proposed thinning may affect the well system of an adjacent landowner west of the project area. The project may affect the wells ability to maintain flow in the dry season.

Proposed thinning may affect the secondary water source of an adjacent landowner west of the project area. The water source originates in a draw on BLM above the property and runs through the property into water collection devices.

Resolution:

Design units, contract language, and harvest plan with the following:

The McKinley Garage Road, BLM road No. 27-11-33.0, would be renovated for log hauling by replacing culverts, adding rock surfacing, etc., and by operator maintenance during the life of the contract. The road would be left in a better condition than it is currently.

The spring would be buffered with a minimum 20 foot no-entry buffer to protect soil stability and water quality.

The draw that drains into the private water collection devices would be buffered with a minimum 50 feet no-harvest zone on each side.

There should be little, if any, measurable change from a thinning on the well system. Timber harvest can create a temporary (until re-growth) increase in water yield proportional to the amount of vegetation removed. See Chapter 4, Hydrology, Commercial Thinning and Density Management, Annual flows and Low Flows.

Issue 3:

Regeneration harvests, restoring alder stands back to conifer stands, in Riparian Reserves would not comply with Aquatic Conservation Strategy.

Resolution:

This was determined by the ID Team to be an inaccurate interpretation of the NFP and Coos Bay District RMP ROD as well as the ACS. "Active silvicultural programs will be necessary to restore large conifers in Riparian Reserves and reforesting shrub and hardwood-dominated stands with conifers" (NFP S & G's, p. B-31). The NFP limits but does not preclude silvicultural treatments in the Riparian Reserves for restoration purposes or to control stocking. In the long term, restoring the upslope red alder areas to conifers would not retard or prevent attainment of ACS objectives, but would rather enhance the Riparian Reserves. The Summary of Aquatic Conservation Strategy for Watershed Restoration states that "silvicultural treatments may be used to restore large conifers in Riparian Reserves" (NFP S & G's, p. B-32). This was determined by the ID Team not to be a significant issue or an issue requiring further analysis.

Issue 4:

Concern for removing 100% of shade along streams.

Resolution:

This was determined by the ID Team not to be a significant issue or an issue requiring further analysis. As described in the Project Design Features and Environmental Consequences sections of this EA, all streams and other aquatic resources will be protected with buffers sufficient to protect water quality by retaining shade and bank stability.

Issue 5:

Concern for removing 100% of shade over the outer half of Riparian Reserves.

Resolution:

This would not affect stream temperature for the same reason as above. This was determined by the ID Team not to be a significant issue or an issue requiring further analysis.

Issue 6:

Concern for removing all red alder trees from the stand because it is most likely a natural component of the stand.

Resolution:

Most of the existing alder is a result of disturbance associated with past logging practices and inadequate reforestation with conifer trees as described in the Affected Environment section below. This was determined by the ID Team not to be a significant issue or an issue requiring further analysis because all the alder would not be removed. Some alder would remain on the stream banks for shade and bank stabilization.

Issue 7:

Concern that removing nitrogen producing alder and then later applying nitrogen fertilizer does not make economic and biological sense.

Resolution:

Nitrogen fertilizer is usually applied to timber stands to increase timber production, however, the primary role of conifer restoration from alder stands is to modify stand structure. Fertilizing at some unknown point in the future is not within the scope of this project analysis. This was determined by the ID Team not to be a significant issue or an issue requiring further analysis.

Issue 8:

Concern about sacrificing mature forests too quickly and using drastic measures to replace it would not hold up under NEPA because it is not scientifically sound reasoning.

Resolution:

The proposal does not include any harvest of mature forests and this comment is outside the scope of this analysis.

Issue 9:

Concern about how much of the snag and down wood component in the Riparian Reserve would be destroyed during logging and site prep burning. Recommendation made to assess current level of down wood in Riparian Reserves and leave standing trees and thinned trees for down wood.

Resolution:

Using the information contained in the stand examinations, the ID Team will assess the current level of down wood and will consider the need to mitigate losses by leaving thinned trees for down wood. Because trees felled for skyline cable corridors that are within 20 foot of streams, and one conifer tree per 100 feet of stream length in the riparian reserves would be felled and retained in the project areas, it is likely that there would be more down wood post-project than currently exists.

Issue 10:

An interested citizen recommended that there be an explanation in the EA of: how putting more wood on the market will help the local economy; of how, when the economy is down, putting more wood on the market will alleviate the low timber prices on private land; of how government timber, sold during a time of low consumer demand and to meet annual targets, contributes to or hinders the purpose and need “to help meet consumer demand for wood products, and help support the timber based economy” (Objective #8).

Resolution:

The ID Team discussed these comments at some length. Basically, timber sales help the local economy by providing jobs. The ID Team discussed that BLM does not time the sale of timber to the market and has no certainty of when the individual project sales would be offered or when they would be harvested under a 2-

3 year contract. There is no way to conduct a reliable analysis of future log market conditions. The ID Team determined that economic benefits to the local economy is not a new issue and was adequately analyzed in the FEIS for the Coos Bay District RMP which documents the benefits to the community in offering timber for sale. It was determined that this issue required no additional analysis and that while the interested citizen did provide an opinion, they did not provide factual information that would support the argument.

Issue 11:

Concern that commercially selling the boles of thinned trees while leaving the tops does not reduce the fire hazard and that other solutions may be available.

Resolution:

The ID Team discussed this matter and realizes there is certain risk associated with leaving flash fuels (tops) in a unit after harvest, however there may be even a greater hazard of leaving the boles and tops in the event of an uncontrolled fire. The tops, being flashy fuel, burn more quickly and can spread faster, but usually produce less heat and extinguish quickly. The boles burn more slowly with intense heat that could damage residual trees and also could be difficult to extinguish.

Issue 12:

Concern that Objective #8, "Develop economically feasible timber sales," is not a valid objective for Riparian Reserves.

Resolution:

As stated above, the ID Team realizes that economic timber sales are not the objective for Riparian Reserves, but rather a economically efficient tool for accomplishing stand restoration to control stocking, and to acquire desired stand characteristics in accordance with the Standards and Guidelines of the Northwest Forest Plan (NFP S & G's, p. C-32,c.), the Aquatic Conservation Strategy.

Issue 13: Port-Orford-cedar (POC) lawsuit

An issue surfaced after the Interdisciplinary Team's resource review, but prior to completion of documenting the analysis in this EA. The issue is a lawsuit regarding analysis of the spread of the Port-Orford-cedar associated root disease.

Resolution:

Drop 20 of the 27 units that were in the original proposal. Due to the lawsuit, the Proposed Action alternative only includes approximately 279 acres that do not contain POC

See the section titled **Alternatives Considered but Rejected** at the end of Chapter 2.

Decisions That Must Be Made

The BLM Field Manager for the Umpqua Field Office, Coos Bay District, must decide whether to proceed with commercial thinning/density management and alder conversion projects within the Middle Creek subwatershed. These projects are described in detail in Chapter 2.

The Field Manager must also determine if the selected alternative would or would not be a major Federal action, significantly affecting the quality of the human environment. If the Manager determines it would not significantly affect the quality of the human environment, then the manager can prepare and sign a Finding of No Significant Impact (FONSI).

If the Manager determines that the selected alternative would significantly affect the quality of the human environment, then the projects must either be dropped, modified or an Environmental Impact Statement (EIS) and a Record of Decision (ROD) must be prepared and signed before the Middle Creek CTs project can proceed

Chapter 2 – Alternatives

NO ACTION ALTERNATIVE
Under this alternative, the project area would receive no treatment in the foreseeable future. There would be no thinning to reduce densities in overstocked stands, nor would there be restoration of red alder stands back to conifer stands. Proposed road construction, improvement, renovation, or decommissioning would not occur.

PROPOSED ACTION - Thin overstocked conifer stands; convert red alder stands back to conifer

Description

Project Location:
The seven Proposed Action units totaling 279 acres are located within six sections in Township 27 South, Range 11 West, Willamette Meridian, which is approximately 10 miles northeast of Coquille, Oregon.

Table 1: Project Area **Acres** and **Locations**

Sale Name	No. of Units	Est. CT/DMT Acres	Est. RH Acres	Total Acres	Township	Range	Section
Old Man's Road CT	2	128	12	140	T. 27 S.	R. 11 W.	13
Cherry Creek CT	3	17	14	31	T. 27 S.	R. 11 W.	23,24 25,26
Cherry 27 CT	2	92	16	108	T. 27 S.	R. 11 W.	27
Totals	**7**	**237**	**42**	**279**			

Silvicultural Treatment
The proposed action is to implement timber harvest activity to treat approximately 279 acres of BLM administered lands. This action would include commercial thinning (CT) of conifer stands in the General Forest Management Area (GFMA), density management thinning (DM) of conifer stands in Riparian Reserves (RR), and regeneration harvest (RH) of red alder stands for restoration back to conifer stands. An alder restoration is a series of treatments designed to replace an alder stand with a conifer stand. Red alder conversion will be done to those alder stands growing on sites where conifer stands had been previously harvested (NFC WA, Appendix: Vegetation and Disturbance Processes, p. 9). The conifer restoration portion of this action would occur on three 3 red alder patches totaling approximately 42 acres. The treatments would be implemented and funded by timber sales tentatively planned for fiscal years 2002 and beyond.

The proposed thinning units vary in size from 2 acres to 130 acres. The alder patch cutting areas vary in size from 12 acres to 16 acres. Units are located in both the GFMA and RR. See Table 2 below for more details.

Table 2: Estimated Unit **Acres** of CT and RH and **MBF** in GFMA and in Riparian Reserve

Sale Name	Unit No.	GFMA			Riparian Reserve			**Total Unit ac.**	GFMA conifer MBF (PSQ)	RR/ GFMA hdwd MBF (NonPSQ)	**Total MBF**
		CT	RH	Total	DM	RH	Total				
Old Man's Road CT	1	108	12	120	10	0	10	130	900	290	1190
	2	8	0	8	2	0	2	10	100	10	110
Cherry Creek CT	2	2	0	2	0	0	0	2	20	0	20
	3A	6	10	16	2	4	6	22	50	500	550
	7	5	0	5	2	0	2	7	30	20	50
Cherry 27 CT	3	50	0	50	42	0	42	92	500	300	800
	5	0	8	8	0	8	8	16	0	300	300
TOTAL		179	30	209	58	12	70	**279**	1600	1420	**3020**

Thinning Prescription: The overtopped and less thrifty trees in the conifer stands within the GFMA and RR would be removed to provide more growing space for the more dominant trees. Approximately 90-130 of the healthier stems per acre would be left. This is equivalent to leave trees being spaced an average of 18 to 22 feet apart. The prescription for individual stands will vary depending on stand age and initial density. The prescribed trees per acre and tree spacing would coincide with a Relative Density (RD) of approximately 35, which is considered as fully occupying the site. Post treatment canopy closure would be maintained at 60% or higher. For more information on Relative Density see Affected Environment (Chapter 3) under Vegetation, Stand Density.

Pacific yew, western redcedar, and most of the large scattered hardwood tree species, except red alder, would be reserved to maintain species diversity.

The proposal to leave similar numbers of trees in the Riparian Reserves as in the GFMA is a conservative prescription that foregoes the most rapid attainment of large trees in favor of maintaining maximum connectivity function. This conservative approach may necessitate a second density management thinning entry in the future to keep the Riparian Reserve stands on a trajectory to develop large trees which will eventually contribute to aquatic resources.

Red Alder Stand Conversion Prescription: Red alder stands in the GFMA and Riparian Reserves would be cut and removed either in conjunction with the thinning operations, or as separate regeneration harvest units. Removal of the red alder is necessary to establish conifers, which cannot survive in the shade of an alder canopy. After harvest, regeneration harvest areas would receive site preparation treatment and would be planted with conifers.

Within red alder stands, scattered individual healthy conifers that are dominant or can respond to release would be reserved. Small dense clumps of conifer occurring within some of the red alder stands would be thinned to improve growth and vigor of the more dominant trees.

Project Design Criteria

Areas Excluded from Harvest:

1. There would be a no-harvest buffer within 20 feet of a stream bank or unstable area near the bank, within 20 feet of the top of the inner gorge, within 20 feet of a floodplain, or within 20 feet of the outer edge of streamside riparian vegetation, whichever is greater. The 20 foot minimum no-harvest buffer could be expanded on a site specific basis to provide additional stream protection, as identified by resource specialists.
2. Expanded no-harvest buffers may include, but are not limited to, such places as fish bearing streams, unstable areas, and alder conversion units.
3. The no-harvest buffer width adjacent to streams in red alder conversion units would be adjusted on a site specific basis. Functionally, the widest forested buffer needed to protect aquatic values is a width equal to half the height of the overstory trees on the site at the time of treatment (NFC WA, Ch. 16, p. 20). The necessary buffer width to provide adequate stream shading would be determined by resource area hydrologists. Width would be dependent on stream size, aspect, existing vegetation and local topography. A no-harvest buffer width would be derived by predicting existing shade patterns at sites along each stream reach, then measuring or estimating the distance of shade-providing trees.
4. Where S&M species discovery sites occur, in or adjacent to unit boundaries, high priority sites would be managed in accordance with appropriate guidelines.
5. The carex-dominated wet area in Unit 7 of the Cherry Creek CT would be buffered from ground disturbing activity.
6. Retain and protect all existing residual trees, snags, and coarse woody material of all decay classes to the greatest extent possible during cable and ground-based logging operations. Snags would be reserved from cutting except those that must be felled to meet safety standards. Any snags felled or accidentally knocked over would be retained on site.
7. Postpone future creation of snags and coarse woody material until conditions following thinning are analyzed and some of the growth benefits of thinning are realized.
8. Boundaries, spur roads, landings, and yarding corridors would be designed to avoid and protect large residual trees whenever possible.
9. All existing down logs in Decay Classes 3, 4, and 5 would be reserved from cutting.
10. Within red alder conversion units, releasable conifers would be reserved from cutting.
11. Retain hardwoods and minor species of conifers when thinning through hardwood and minor conifer species patches, except within the designated hardwood conversion areas. Within red alder conversion units, individual large bigleaf maple and myrtle would be reserved for habitat diversity provided that it is compatible with establishing a conifer stand. Stump sprouted maples and myrtles that are reserved would be cultivated to encourage large single stem trees.

Harvest Requirements:

Tree falling:

1. Design or relocate boundaries, spur roads, landings, and logging corridors to avoid and protect large residual trees and snags whenever possible.
2. In ground based harvest areas, a cut-to-length harvester would be required to cut trees.
3. In cable harvest areas, conventional tree falling with chain saws would be used. Trees in skyline cable yarding corridors would need to be cut to facilitate operating a cable yarding system. Trees would be required to be directionally felled into the lead of cable yarding corridors.
4. Trees that must be felled within the no-harvest buffer to provide yarding corridors would be felled toward the stream channel and retained on site to provide bank armoring and coarse woody debris.
5. Trees in thinning units would be required to be limbed, topped, and cut into log lengths not exceeding 40 feet prior to yarding.
6. Conventional falling with chain saws would be permitted only from July 1 to March 31 to reduce bark damage during high sap flow.
7. Falling with a cut-to-length harvester typically would be permitted only during late spring through early fall when soil moisture content is below the 25% plastic limit.
8. Within safety standards, all trees would be directionally felled away from roads, posted boundaries, orange painted reserve trees, riparian areas, and snags.

9. After completion of yarding one co-dominant conifer tree per 100 feet of stream length would be felled from outside the no-harvest buffer in the riparian reserve toward the stream. The felled trees would remain on site to provide short-term large woody debris.
10. In units that allow the purchaser to select the trees to be removed, the contractor should be made aware of options beneficial to wildlife that should be considered during tree selection. This would include leaving any/all trees that contain any probable bird or mammal nests. This would include nests or cavities that may be currently in use or have been previously used by birds or mammals. The contractor should also be allowed to leave low value trees which have damaged tops or other abnormalities which may provide a valuable wildlife habitat component, while having little effect on the results of the thinning operation.

Yarding:

1. In ground based harvest areas, a cut-to-length harvester and forwarder would be required. The harvester reaches out up to 35 feet, cuts trees down, limbs, bucks, and decks logs on site. The forwarder loads and hauls logs to the landing. The mechanical harvester travels on slash created by the harvester during log processing. Unlike crawler tractors or skidders, cut-to-length harvesters and forwarders do not have blades to move soil or organic material. The old existing skid trails would act as forwarder roads and have multiple passes as the primary travel path. Ground based equipment would not be permitted to travel through stream channels. The old existing skid trails used for forwarder yarding paths would be blocked to vehicle traffic near their junction with all weather roads. A crawler tractor/skidder could be used in conjunction with road construction to skid logs within the road construction right-of-way.
2. Generally, terrain < 35% would be designated as harvester/forwarder logging areas.
3. The season for yarding ground based areas typically would be late spring through early fall when soil moisture content is below the 25% plastic limit. Based on review of plastic limits of the probable soils within these units, a maximum operational allowable moisture content will be 25% as measured by the Authorized Officer using a "Speedy" moisture meter or an equivalent method. Soil moisture above 25% may require the discontinuation or limitation of ground-based operations in order to prevent excessive compaction to the soils and/or destruction of the soil column.
4. Cut-to-length equipment would be required to travel on slash deposited by the harvester, avoid exposed mineral soil, minimize passes to the greatest extent, and utilize existing compacted skid roads for main pathways.
5. Generally, terrain > 35%, or terrain inaccessible to cut-to-length harvesters, would be designated as skyline cable logging areas. A skyline cable system could be permitted to operate during the wet season in areas identified above for a cut-to-length harvest system provided road surfaces have adequate rock or a bituminous surface for wet season haul.
6. In cable yarding areas, a skyline cable system with 75 foot lateral yarding capability with one-end log suspension would be required.
7. Skyline corridors would be required to be a maximum of 12 feet wide. The location, number, and width of cable yarding corridors would be specified prior to yarding, with natural openings used as much as possible. Distance between skyline corridors would be required to be a minimum of 150 feet apart at the unit edge where feasible. Corridors in the thinned areas would be required to be perpendicular to the streams as much as possible to avoid any adverse effects from yarding radially from only a few landings.
8. Logs would be yarded away from all streams whenever possible. In areas where this is not possible consideration would be given for leaving patches of un-thinned forest to increase habitat diversity. This may be practical in areas such as points where Riparian Reserves intersect near stream confluences, or in areas where damage to stream, riparian buffer, or existing habitat features would be excessive in relation to the potential benefits to be gained from the thinning operation.
9. Full log suspension would be required across stream channels with visible surface flow to protect stream banks. In situations where full-log suspension is not feasible across stream channels with visible surface flow, one-end suspension would be required and the timing for yarding would be limited to the dry season. Lift trees and intermediate supports would be required where needed to help attain desired log suspension.
10. Cable yarding would be restricted between March 31 and July 1 to minimize damage to residual trees during periods of high sap flow.
11. Hauling on dirt-surfaced roads will be restricted between July 1 and October 15 unless dry conditions extend the hauling season.

12. A helicopter would be required to yard logs in those areas where road access is limited, stream protection is required, or other areas need protection. Helicopter yarding would be allowed where cable or ground based yarding is specified provided it is authorized by the BLM.
13. Once haul is completed, sediment retained by the ditch line filters would be transported to upland locations to prevent subsequent delivery to aquatic resources.

Table 3: **Harvest system acres** and **seasonal haul roads** by unit:

Sale Name	Unit No.	Cut-to-length/ for-warder	Skyline cable	Unit Acres	Roads Restricted to Dry Season Hauling
Old Man's Road CT (140 ac.)	1	70	60	130	-7.1 road, new spur road
	2	3	7	10	-
Cherry Creek CT (31 ac.)	2	0	2	2	-
	3A	0	22	22	-
	7	0	7	7	-23.2, -23.4 dirt spurs
Cherry 27 CT (108 ac.)	3	0	92	92	-22.0 dirt, old dirt, new spurs
	5	0	16	16	-22.0 dirt extension
TOTAL		73	206	279	

The road construction acres are included in the above figures and could be completed with ground-based equipment such as crawler tractors, skidders, or cut-to-length systems.

Wildlife Requirements:
1. Units within 1/4 mile of a northern spotted owl core area would require seasonal restrictions from March 1 through June 30.
2. Units within 1/4 mile of either an occupied site or un-surveyed suitable habitat for marbled murrelets would require seasonal restrictions from April 1 through August 5 and daily timing restrictions from August 6 through September 15. Daily timing restrictions allow any potentially disturbing activities to occur only from 2 hours after sunrise to 2 hours before sunset.
3. Helicopter use would not be allowed within 1/2 mile of an occupied owl or murrelet site or un-surveyed suitable murrelet habitat during seasonal restrictions and daily timing restrictions.

Adherence to these wildlife requirements would result in a "may effect, not likely to adversely affect" determination for the northern spotted owl and marbled murrelet (USDI USFWS 2002).

Table C in Appendix I summarizes the seasonal restrictions and daily timing restrictions of each unit for various harvest operations.

Noxious Weed Management
Roads will be brushed prior to any harvest or road construction activities to help prevent the spread of existing noxious weeds.
1. To prevent the introduction and spread of noxious weeds during the contract period, machinery and equipment would be washed prior to entering contract areas.

2. To help prevent the introduction or spread of noxious weeds, vehicles and equipment would be required to stay on road and landing surfaces, except equipment specifically designated to operate off of roads and landings (e.g. mechanical harvesters).
3. Noxious weeds, on existing or new roads on BLM land used within this project area, will be treated manually, mechanically, or chemically prior to road construction or harvest activities. Treatments will allow for safe vehicle use while limiting contact with weeds/seeds.

Roads

Access

Access to units for log hauling would be from existing asphalt roads, rock surfaced roads, or dirt surface roads. Some of the roads would require renovation or improvement. Construction of new rock surface or dirt surface roads and roadside landings would also be required to access some of the proposed units. Existing roads are controlled by BLM, or BLM has rights to use existing roads or construct roads under reciprocal road right-of-way agreements.

New Road Construction

New road construction would consist of approximately 0.6 miles of dirt or rocked surface roads and landings, constructed on or near ridge top locations. New roads would be single lane with turnouts. Some landing construction would consist of expanding or creating wide spots on existing roads to facilitate safe yarding and loading of logs. Cable and cut-to-length system landings are typically about 1/4 acre in size including the existing roadbed. No new roads or new landings would be constructed in RRs. Some of the roadside landings to be constructed on or adjacent to existing roads would be in the upland portion of the RRs. All road construction would be required to be completed in the dry season. The new roads designated for closure as shown in the tables below would be decommissioned within a year after operations are completed. See Tables 4a and 4b below for summary and detail information respectively. Information regarding new road construction in the Cherry Creek Tier 1 watershed can be found below in Table 4d.

General and Specific Road Requirements from Soils and Geology Report

1. Care must be exercised in road construction to minimize intersections with stratigraphy dip angles inclined with the slope (BLM, 1995).
2. Care must be exercised in road construction through landslide topography, observant of recent or on-going slide features such as hummocky topography, “pistol-butt” trees, and/or seeps and springs.
3. Construct an appropriate crossing through the gully identified in Unit 3 of Cherry 27 CT.

Road Renovation/Improvement

Road renovation would consist of returning existing roads back to their original standard of construction. It could include clearing brush and/or trees along roadsides, cleaning or replacing culverts, restoring proper drainage of the road surface, grading, or other light maintenance. Road improvement would consist of raising the current standard of a road with some capital improvements to a higher standard. Improvements may include but are not limited to: adding culverts, surfacing existing dirt roads or adding rock to existing rocked roads. Rock surfaced roads would allow cable harvesting and hauling during the wet season. Road renovation or improvement would be required in the dry season for activities requiring soil displacement, such as culvert installation or replacement. See Tables 4a and 4c below for summary and detail information respectively. Information regarding road renovation or improvement in the Cherry Creek Tier 1 watershed can be found below in Table 4d.

Road Maintenance

Existing roads would be maintained during the life of the project to minimize road drainage problems and possible road failures. Maintenance on BLM controlled asphalt and rock surfaced roads would be performed by BLM road maintenance crews. Maintenance on other rock surfaced roads and dirt surfaced roads would be required by the contractor. Maintenance may include but is not limited to: grading to remove ruts, removal of bank slough, placement of silt trapping straw bales, and adding gravel lifts where needed, such as stream crossings and soft spots in the road surface.

Dirt roads and landings would receive seasonal preventative maintenance prior to the onset of winter rains each year prior to the contractor leaving the project area during non-hauling periods. Seasonal preventative maintenance may

include, but is not limited to cross ditching, removing ruts, mulching, and barricades. Bare soil areas from landing and road construction would be mulched and seeded with native plant species, if available, and fertilized. If native seed is not available, bare road surfaces would be seeded with an approved District seed mix.

Seasonal Restrictions
Road and landing construction, road renovation/improvement, and decommission would be required in the dry season to protect streams. Table 3 above shows the roads that would require dry season hauling. Table C in the Appendix I shows seasonal restrictions.

Road Closure/Decommissioning
After harvesting is completed, 0.5 miles of the 0.6 miles of new construction roads, and 2.2 miles of renovated or improved rock and dirt surface roads, under BLM control, would be decommissioned. Water barring, sub-soiling, pulling in-stream culverts, and seeding and mulching would be required as needed to reduce potential erosion and to help restore the natural hydrologic flow. Decommissioned roads would also be barricaded to prevent vehicle passage. The net reduction in road miles, due to decommissioning newly constructed and existing roads, would be 2.1 miles. See Tables 4a and 4e below for summary and detail information respectively regarding road decommissioning.

Table 4a through 4e below show proposed new roads, existing roads to be improved or renovated, and roads to be closed. The table showing renovation does not include culvert replacement on blacktop roads.

Table 4a: **Road Summary**: New Road Construction, Improvement/Renovation, Proposed Road Closures

Sale Name	**proposed new roads**		**existing roads**			
	construction miles	**closure miles**	**renovation or improvement roads***	**miles**	**closure miles**	
					data base roads	**old roads not in data base**
Old Man's Road CT	0.3	0.3	27-11-13.0, 27-11-13.1A 27-10-7.1, 27-11-13.3, 27-11-13.4	3.6	1.1	0.0
Cherry Creek CT	0.1	0.1	27-11-23.2, 27-11-23.4 Unnumbered spur	2.0	0.7	0.1
Cherry 27 CT	0.2	0.1	27-11-22.0, 27-11-27.6	1.8	0.3	0.0
TOTAL	**0.6**	**0.5**		**7.4**	**2.1**	**0.1**

There would be a **net decrease of 2.1 road miles** in the Middle Creek subwatershed after the roads listed above are decommissioned. 0.6 - (0.5 + 2.1 + 0.1) = - 2.1

Table 4b: Proposed **New Road Construction**, road **closures,** and **landings**

Sale Name	Unit	new construc-tion miles	surface type	closure miles	No. of new landings to construct	No. of new landings in RR	Roadside landings w/ minimal (1) or no construction	Roadside minimal landings in RR (2)
Old Man's Road CT	1	0.3	dirt	0.3	1	0	25	2
	2	0.0	-	0.0	0	0	3	1
Cherry Creek CT	2	0.0	-	0.0	0	0	1	0
	3A	0.1	rock	0.1	2	0	2	0
	7	0.0	-	0.0	0	0	3	0
Cherry 27 CT	3	0.1	dirt	0.1	1	0	13	0
	5	0.1	rock	0.0	1	0	1	0
TOTAL		**0.6**		**0.5**	**5**	**0**	**47**	**3**

(1) Minimum construction may consist of widening a turnout or cutting into cut bank to gain some extra width on a road
(2) Landings in riparian reserve areas (based on GIS) are on ridge tops or in upland portions of riparian reserves

Table 4c: **Renovation/improvement** and subsequent **closure** of existing BLM roads

Sale Name	existing roads proposed for use	proposed renovation or improvement	miles	proposed closure miles	
				data base roads	old roads no data base
Old Man's Road CT	27-11-13.0 27-11-13.1A 27-10-7.1 27-11-13.3 27-11-13.4	Renovate rock surface Renovate rock surface Renovate rock surface Renovate rock surface Renovate rock surface	1.6 0.3 1.1 0.4 0.2 3.6	- 0.3 0.2 0.4 0.2	- - - - -
Cherry Creek CT	27-11-23.2 27-11-23.2 dirt 27-11-23.4 Spur- unit 2	Renovate rock surface Renovate dirt surface Renovate dirt surface Renovate rock surface	1.2 0.4 0.3 0.1 2.0	- 0.4 0.3 -	- - - 0.1
Cherry 27 CT	27-11-22.0 27-11-22.0 dirt 27-11-27.6, spur	Renovate rock surface Renovate dirt surface Improve dirt (add rock)	1.1 0.3 0.4 1.8	- 0.3 -	- - -
TOTAL			**7.4**	**2.1**	**0.1**

Table 4d: **Road Summary - Cherry Ck Tier 1 Drainage:** New Construction, Improvement/Renovation, Road Closures

Sale Name	proposed new roads		proposed use of existing roads			
	construction miles	closure miles	renovation or improvement roads*	miles	closure miles	
					data base roads	old roads not in data base
Old Man's Road CT	0.3	0.3	27-11-13.1A 27-10-7.1	0.3 1.1	0.3 0.2	- -
Cherry Creek CT	0.1	0.1	27-11-23.2 rock 27-11-23.2 dirt 27-11-2.4 spur (u-2)	1.2 0.4 0.3 0.1	- 0.4 0.3 -	- - - 0.1
Cherry 27 CT	0.2	0.1	27-11-22.0 27-11-22.0 ext. 27-11-27.6, spur(u-3)	1.1 0.3 0.4	- 0.3 -	- - -
TOTAL	**0.6**	**0.5**		**5.2**	**1.5**	**0.1**

There would be a **net decrease of 1.5 road miles** in the Cherry Creek Tier 1 drainage after decommissioning roads is completed: 0.6 - (0.5 + 1.5 + 0.1) = - 1.5

Table 4e: **Summary of Road Closures** (new roads shown in *italics*)

Sale Name	Description of existing roads & new roads used in proposed action	Road surface upon completion of sales	miles used	proposed closure miles		*Remarks*
				data base roads & *new roads*	old rds not in data base	
Old Man's Road CT	*27-11-13.0* *27-11-13.1A* *27-11-13.3* *27-11-13.4* *27-10-7.1* *New spur*	Rock Rock Rock Rock Rock *Dirt*	1.6 0.3 0.4 0.2 1.1 *0.3*	- 0.3 0.4 0.2 0.2 *0.3*	- - - - - -	- Decom at -13.0 jct. Decom at -13.0 jct. Decom before new spur *Decom 500' before spur*
Cherry Creek CT	27-11-23.2 27-11-23.2 ext. 27-11-23.4 Spur- unit 2 *New spur-u3A*	Rock Dirt Dirt Rock *Rock*	1.2 0.4 0.3 0.1 *0.1*	- 0.4 0.3 - *0.1*	- - 0.1 -	- Decom at progeny site - - *Decom at -23.0*
Cherry 27 CT	27-11-22.0 27-11-22.0 ext. 27-11-27.6, spur *New spur-u3* *New spur-u5*	Rock Dirt Rock *Dirt* *Rock*	1.1 0.3 0.4 *0.1* *0.1*	- 0.3 - *0.1* -	- - - -	 Decom at end of rock *Decom at -7.0* *Decom at -27.3 junction-*
TOTAL			**8.0**	**2.6**	**0.1**	

Site Preparation and Burning

1. General Fuels Treatment Recommendations for All Project Areas

Falling:

Directional falling away from all project area boundaries, mainline roads or roads not planned for closure or decommissioning, property lines, and managed known sites for S&M species would be required.

Landing Pullback:

Require landing pullback from around all cable landings prior to the removal of equipment. Material should be placed on top of the existing landing. Also, pullback any material, dirt and wood, that results from sweeping debris from the landing.

Roadside Hazard Reduction:

- Hazard reduction measures would be done along roads within the project area that are not identified for closure or decommissioning after harvest operations.

-Post-harvest fuel loadings on landings and along primary and secondary forest roads would require fuels treatment for hazard reduction.

- If a ground based processor is used, ensure that, as much as is possible, the operator falls trees away from roads to reduce the necessity for and amount of roadside hazard reduction measures.

- Hand or machine pile all slash ½" to 4" in diameter within 20 feet each side of those roads within harvest areas not identified for closure or decommissioning after harvest. Cover piles of slash with black plastic and burn during late fall and winter months. Any roadside machine piling during potential wet periods should be closely regulated in order to reduce the contamination of piles with soils and to reduce the possibility of soil disturbance and erosion to the ditch lines.

- Landing piles resulting from cable yarding operations would be burned. Piles need to be located a sufficient distance away from leave trees to minimize scorching when burning. Cover with black plastic and burn during late fall and winter months.

- As an alternative to burning, landing piles and/or concentrations from ground based processor and cable operations located within the interior of the project areas and along roads designated for post-harvest closure or decommissioning, would be broken up and sufficiently scattered before equipment is removed from the site. Some of this material could be used to reintroduce organic material to natural road surfaces by scattering slash over the decommissioned road.

2. Management Prescriptions Relating to Natural Fire Effects and Bio-Diversity

To emulate the natural effects of fire on stand composition on a landscape level, fire intolerant species such as hemlock and red cedar should be selected more heavily for removal on sites near ridge tops, on south and west aspects and on sites where plant indicators signal drought conditions. The number of fire intolerant species marked for removal should decrease progressively downslope and also decrease on north aspects. In riparian reserves, a sufficient number of fire intolerant/shade tolerant species should be retained to provide an adequate seed source for future understory development. Larger gaps in the canopy, created either by removal of additional overstory trees or by creation of snags or snag patches will promote the regeneration of shade tolerant trees and subsequent understory development.

3. Alder Conversion Project Areas

Site Preparation

Anticipated post-harvest fuel loadings (PNW-GTR-231, Series 3-RA-PRE-01, 02 or 03) in regeneration harvest units will require some form of fuels treatment to prepare the sites for planting. Multiple site preparation options exist based upon anticipated post-harvest site conditions. The most appropriate and effective method or combination of methods would be used to (1) prepare the site for planting at an approximate 9' x 9' spacing or 530 trees per acre, (2) reduce the amount or retard the re-establishment of competing vegetation, (3) reduce hazardous fuels (Table 5).

Hand Piling and Burning

Slash and lop existing undesired vegetation (brush, non-commercial hardwoods, prostrate conifers) during or after harvest, then hand pile all slash ½" to 4" in diameter. Cover piled slash with black plastic and burn during fall /early winter months. Jackpot/swamper burning would be an allowable substitute for hand piling where fuels are unevenly distributed in spotty but heavy concentrations. Jackpot/swamper burning involves covering heavy fuel concentrations with plastic and then burning those concentrations out during the fall/early winter months. Swampers would attend to the burning and create additional planting spots as needed by throwing (swamping) additional slash from the

surrounding area into the burning concentrations. Additional saw work would be done as needed to facilitate swamping.

Broadcast Burning

Done under spring-like conditions by hand or aerial ignition. Construct hand fire lines to mineral soil with water bars on the exterior of unit boundaries. One hundred percent mop up of burned areas would be required. Retain a sufficient number of standing green trees in the unit to fall after burning to meet coarse wood requirements.

Gross/Whole Tree Yarding

Conversion units that are directly adjacent to Bonneville Power transmission would be gross/whole tree yarded in whole or in part (gross yard within 100feet of lines), to prepare the site for planting. Landing slash would be moved a sufficient distance (100 feet) from transmission lines to allow for burning. In addition to gross/whole tree yarding, areas of units receiving that treatment would also have all leftover, broken tops and all undesired vegetation (brush, non-commercial hardwoods, prostrate conifers) slashed and lopped during or after harvest.

Reforestation

When considering the use of a species mix for reforesting a site, fire intolerant species such as hemlock and cedar, should in general, be limited to planting in the riparian reserves, north aspects and the lower portions of south and west aspects.

Table 5: **Alder Conversion (Regeneration Harvest) Site Preparation Prescriptions**

Sale Name	Unit No.	Total Acres RH	Recommended Treatment
Old Man's Road CT	1	12	hand pile, cover, burn
Cherry Creek CT	3A	14	hand pile, cover, burn
Cherry 27 CT	5	16	broadcast burn
Totals		42	

Standard Design Features and Management Requirements

1. Implementation monitoring would be accomplished in the form of: road construction and renovation inspections; logging inspections; and noxious weed monitoring. Monitoring would also consist of silvicultural inspections of planting and stand maintenance following regeneration harvest and site preparation until the trees are free to grow.
2. A standard special provision would be included in the contract to require compliance with applicable Oregon State Fire Laws. Disposal of slash through various burning methods requires compliance with the Oregon Smoke Management Plan.
3. The timber sale contract would contain appropriate provisions for the appropriate disposal of wastes and handling of hazardous materials. State of Oregon Department of Environmental Quality (DEQ) for spill prevention and containment will apply to any sale contracts resulting from this EA. Site monitoring for solid and hazardous waste will be performed in conjunction with normal contract administration. Any spills or releases resulting from operations shall be subject to the District Spill Plan.
4. If Sensitive, Threatened, or Endangered plant and animal species are found in the sale units, management guidelines for the species will be implemented. Timber sale contracts will include a special provision which includes management guidelines for: T&E species, occupied marbled murrelet sites, federal proposed, federal candidate, Bureau sensitive or State listed species protected under BLM Manual 6840,and active raptor nests.
5. If planned activities are found to adversely affect listed species, formal consultation with the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS) will be required before award of any timber sale or implementation of the activity. Where appropriate, mandatory terms and conditions will be implemented.
6. Native American Grave Protection and Repatriation Act (43 CFR Part 10; IM OR-97-052) Notification Requirements will be followed. If any important cultural materials are encountered during the project, all work in the vicinity will stop and the District Archaeologist will be notified at once.

ALTERNATIVES CONSIDERED BUT REJECTED

1. A suggestion was made by an interested citizen during the public scoping period that a non-commercial restoration-only alternative be analyzed for the Riparian Reserve by retaining thinned trees in the Riparian Reserve. The reason for the suggestion is that PSQ is not an objective for logging in the Riparian Reserve, a non-commercial restoration-only alternative is a reasonable alternative.
Resolution: The ID Team considered and discussed this alternative, but determined that a non-commercial restoration-only alternative for the Riparian Reserve is not reasonable because:

1. there is no funding otherwise available to accomplish this restoration work, whereas a commercial sale would pay for the work;
2. revenue from the commercial project would contribute funds to the federal government;
3. a commercial sale would provide wood for society instead of wasting a valuable natural resource;
4. in the hardwood conversion areas, alder trees would need to be removed to be able to plant conifers;
5. an additional fire hazard would be created from leaving large amounts of downed conifer trees in the thinned areas;
6. a high potential for a Douglas-fir beetle infestation would be created by leaving 4 or more down Douglas-fir trees per acre greater than 10 inches diameter in the thinned areas, (Goheen, 2000) and;
7. an abundance of down trees and slash would preclude use and likely create barriers to some wildlife species.

The probable sale quantity (PSQ) in the RMP is one of the primary objectives for the Matrix, but not for the Riparian Reserve. Even though there is no volume objective for the Riparian Reserve portion of matrix lands, commercial thinning and hardwood conversion are the means to achieve restoration objectives in the Riparian Reserve. Secondary benefits are derived from recovering wood products and producing revenue.

2. Another suggestion was made by an interested citizen that the BLM analyze an alternative which considers the benefits and impacts of a non-commercial restoration-only project, by killing and leaving trees in place, compared to benefits and impacts of killing trees, road building, yarding, and hauling.
Resolution: The IDT considered and discussed this alternative, but determined that a non-commercial restoration-only alternative for the entire project is not feasible because of the same reasons listed above for a restoration-only project in the Riparian Reserve. The impacts from road construction, yarding, hauling, and site preparation is analyzed in the proposed action.

3. Originally all of the 27 originally proposed units in Chapter 1 were considered for analysis in the Proposed Action alternative. However, there is a lawsuit pending in regard to timber sales with Port-Orford-cedar (POC) on the Coos Bay District.
Resolution: Only 7 units from the original proposal in Chapter 1 are included in Chapter 2. These are the units that have no known POC, and do not have POC along the haul routes.

Table 6 below shows all of the proposed units that are an "Alternative Considered but Rejected."

Table 6: Estimated **Unit Acres** of CT and RH and **MBF** in GFMA and in Riparian Reserve **with POC**

Sale Name	Unit No.	GFMA			Riparian Reserve			**Total Unit ac.**	GFMA conifer MBF (PSQ)	RR/ GFMA hdwd MBF (NonPSQ)	**Total MBF**
		CT	RH	Total	DM	RH	Total				
Mast Creek CT	1	90	0	90	40	0	40	**130**	900	400	**1300**
	2	116	4	120	105	0	105	**225**	1200	1000	**2200**
Cherry Creek CT	1	10	10	20	33	25	58	**78**	100	960	**1060**
	3B	0	12	12	0	6	6	**18**	0	500	**500**
	4	20	2	22	18	4	22	**44**	200	300	**500**
	5	42	0	42	0	0	0	**42**	500	0	**500**
	6	20	0	20	2	0	2	**22**	200	20	**220**
Cherry 27 CT	1	80	0	80	16	0	16	**96**	850	150	**1000**
	2	24	0	24	0	0	0	**24**	200	0	**200**
	4	6	0	6	4	0	4	**10**	50	50	**100**
Powerstrip CT	1	16	5	21	0	0	0	**21**	100	100	**200**
	2	44	0	44	40	0	40	**84**	400	400	**800**
	3	75	0	75	57	0	57	**132**	800	600	**1400**
	4A	103	15	118	109	10	119	**237**	1000	1900	**2900**
	4B	40	0	40	35	5	40	**80**	400	400	**800**
	5	10	0	10	6	0	6	**16**	200	100	**300**
Jerusalem Creek CT	1	265	75	340	265	75	340	**680**	2700	7200	**9900**
McKinley Garage	1	120	10	130	120	0	120	**250**	1400	1400	**2800**
Cherry Park CT	1	42	0	42	34	0	34	**76**	500	300	**800**
	2	10	0	10	11	0	11	**21**	100	100	**200**
	3	0	10	10	0	10	10	**20**	0	300	**300**
	4	16	8	24	16	8	24	**48**	100	500	**600**
TOTAL		1149	151	1300	911	143	1054	**2354**	11900	16680	**28580**

Chapter 3 - Affected Environment

Physical and Geographic Characteristics

The project area is located approximately 15 air miles southwest of Coos Bay, Oregon, in the Pacific Coast Range. The legal description is T.27S., R.11W., Sections 13, 23, 24, 25, 26, and 27, Willamette Meridian. The seven proposed treatment areas of 279 acres are located in the Middle Creek subwatershed within the North Fork Coquille 5th field watershed. The elevation of the project units ranges from 300 to 1400 feet. The steepness varies from a gentle to steep with slopes ranging from 0 to 80 percent.

Vegetation

Past Management
Most of the stands have been managed for timber production. Some have received active management with silvicultural treatments such as pre-commercial thinning, brush control, and fertilization to enhance growth and vigor. The conifer stands are dense because they were either not pre-commercially thinned, or have grown substantially since being pre-commercial thinned, to a point where the stem exclusion stage of development has been reached. Some of the stands have been managed passively and have received little or no silvicultural treatment. Most of the stands with a predominance of alder were the result of reforestation failures as evidenced by historical aerial photographs and the presence of conifer stumps. Some of the alder stands were treated unsuccessfully with herbicides as evidenced by the many fork-topped alders.

Conifer overstory
The overstory trees are a result of managed stands established after timber harvest. The stand ages range from approximately 29-42 years old and were established either by planting, aerial seeding, natural regeneration or a combination of these. Tree diameters average approximately 11 inches in diameter breast height (DBH). Most of the project stand acres (85%) are overstocked conifer stands, primarily Douglas-fir, with the remainder of the project stand acres (15%) being predominantly red alder. Other tree species occasionally found mixed in the Douglas-fir or red alder stands are: western hemlock, western redcedar, grand fir, Pacific yew, golden chinquapin, tanoak, bitter cherry, Oregon myrtle and bigleaf maple. Table 6 below shows stand information based on data from stand exams in the proposed project area.

Red Alder Stands
The red alder stands, shown as regeneration harvest units in Tables 1 and 2, are primarily a result of soil disturbance from past harvest and road construction. Prior to harvest activities, red alder, a native species, was present in the watershed but was associated with bare soil areas created from stream bank scouring, natural slumps or slides, or flood plains.

Red alder is relatively short lived with a maximum age of approximately 100 years (Fowell 1965), and is often in association with salmonberry. Salmonberry can reproduce by seed as well as by layering, basal sprouting, and rhizomes. Most seed can be dormant in the soil for many years, perhaps decades, creating a large seed bank (Jensen et al. 1995).

Conifer and other hardwood species, such as bigleaf maple, Oregon myrtle and tanoak, are present in varying degrees as scattered clumps or as individual trees within most of the alder stands. The clumped or scattered individual conifer trees within the alder stands can vary from dominant overstory to suppressed understory. Often conifers that are almost above the canopy will have difficulty growing above the red alder canopy because the wind causes the stiff lateral alder branches to whip the individual conifers, thus damaging and breaking off the terminal buds (Weirman, Oliver 1979).

The stand exams for the alder stands being proposed for conversion show the following species composition. The alder composition in the individual units ranges from 75% to 98%. According to Franklin et. al. in Research Paper PNW-447, *Interim Definitions for Old-Growth Douglas-fir and Mixed Conifer Forest in the Pacific Northwest and California,* the current conifer stocking level in these stands is below the minimum standard to meet objectives for development into old growth characteristics.

Additional stand information is available in the silvicultural prescriptions located in the analysis file.

Stand density

Relative density (RD in Table 6 below) expresses the density of the trees relative to a theoretical maximum density. RD increases for a given number of trees per acres as stem diameters increase. RD decreases for a given stem diameter if the number of trees per acre decrease. A relative density (RD) of 55 or higher indicates a zone of suppression-induced mortality. An RD of 35 is considered full site occupancy; as depicted in Table 6, all stands in the project area exceed this density. A site with an RD of 25 to 35 is considered less than fully occupied and capable of understory development (Journal of Forestry, August 1997). The stands being considered for commercial thinning are overstocked and are either in, or are approaching, the stem exclusion phase of stand development.

Understory

Where light is able to penetrate the canopy, understory brush species consists primarily of rhododendron, vine maple, huckleberry, sword fern, salmonberry, salal, and Oregon-grape. Understory vegetation over the project area is sparse in comparison to adjacent stands with lower stocking densities.

S&M and Special Status Plants

The habitat of these forested stands and rock outcrops are common throughout the subwatershed. The species that occur within the area of the proposed action are present in the matrix as well as adjacent reserved areas. There are several known sites of Survey and Manage and Special Status plant species in the subwatershed.

Port-Orford-Cedar (POC)

POC is not known to be present on BLM land in either the proposed action units or along the haul routes for the proposed action units in this alternative.

Table 7: Stand Information

Sale Name	Unit	Acres	Stand Age	Aver. Trees/ac	Aver. DBH	Residuals present	Remarks
Old Man's Road CT	1	130	30	365	9.3	no	RD 62, BA 171 does not include 12 acre alder conversion
	2	10	29	189	11.7	no	Douglas-fir stand
Cherry Creek CT	2	2	33	235	11.4	no	Conifer stand similar to Cherry Creek Unit -7
	3A	22	38	195 alder 838 mixed	11.3 alder 6.5 mixed	no	RD 45, BA 135, 100% alder RD 85, BA 195, 56% alder/myrtle
	7	7	36	278	11.8	no	RD 61, BA 210
Cherry 27 CT	3	92	36	285	10	no	RD 55, BA 155, Stand exam: trees > 7"
	5	16	42	165 alder 39 mixed	12.0	no	RD 46, BA 160, 81% alder with scattered conifer and hardwoods
TOTAL		**279**					

RD = Relative Density BA = Basal Area of stems (sq. ft./ acre at dbh)

Noxious weeds

Noxious weeds that are known to occur within the project area are: French broom, Scotch broom, Himalayan blackberry, Canadian and bull thistles, and gorse. Another non-native weed species of concern is Pampas grass. The entire Middle Creek Subwatershed has been treated for broom species a number of times, and all the known gorse sites have been treated and are being monitored. Scotch and French brooms will continue to be treated as time and funding allow. Noxious weed

introduction and spread is occurring mostly on disturbed ground along roads as a result of vehicle traffic. These sites act as seed sources for dispersal to other ground disturbance sites, either natural or human caused.

Geological Formations and Soils

Geological Formations
The project areas are located in the Tyee sedimentary basin. The stratigraphies include members of the Tyee Formation, the Camas formation, and the Umpqua group. Different map names have been applied by different map makers to the same units. All of the units are sedimentary sandstone, siltstone, and mudstone, exhibiting similar characteristics attributed to the Tyee Formations.

Associated hazards of the Tyee Formations, and those similar in lithology, include: rapid erosion, flash flooding, rapid mass movement, and stream bank erosion. The type of failure is determined by the steepness of slope, the angle of stratigraphy dip, the combination of stratigraphy type, moisture, and disturbance. Certain units of the project have been mapped with greater than 20 degrees dip. Certain units of the project have also been mapped as landslides.

Multiple fault systems are located throughout the project area. However, they do not appear to disturb Quaternary deposits. Therefore, it can be assumed that the majority of these fault systems have not been active during the Quaternary deposition, ranging from 2.0 million years ago to present. However, the lack of recent activity does not dismiss the potential for activity along a fault.

Soils
The soils within the project are derived from the Tyee and similar formations. They include:

- Blachly silty clay loam,
- Honeygrove silty clay loam,
- Milbury-Bohannon-Umpqua Association,
- Preacher-Blachly Association,
- Preacher-Blachly-Digger Association,
- Preacher-Bohannon loam,
- Umpcoos-Rock Outcrop Association,
- Wintley silt loam.

The highest percent of area compaction exists in the Old Man's Road CT, with 2.73 percent of the sale acreage showing compaction. This is 9.27 percent below the maximum area of allowable compaction of 12 percent allowable compacted area as stated in the BMP for Ground-Based Yarding systems (RMP ROD Appendix D-5 BLM, 1995).

The upper six inches of old skid roads within the proposed action timber sale units have either recovered or are partially recovered from previous timber sale activity. On the old skid trails, trees have begun to seed in and a duff layer of ½" to 1½" has developed on the surface. Ranging from approximately one to five inches below ground surface, a fragipan is still present. Subsoiling of the old skid roads would cause root damage to the trees that have grown adjacent to the skid trails.

The range of maximum allowable soil moisture for ground-based operations is 25 percent to 40 percent, based on the plastic limits of individual soil members. Operation on soils below the plastic limit will help decrease compaction of the soil pore space. In addition, the RMP requires that such operations occur during the driest time of year. The use of plastic limit for soil moisture will ensure that the soils are at the driest point irrespective of the time of year. Additional detailed explanations, calculations, and references can be found in the Geologist/Soil Scientist report in the Analysis file.

There are no project acres administratively withdrawn by the Timber Production Capability Classification (TPCC). The TPCC is a land classification system used to partition all public lands within the Sustained Yield Unit (SYU) boundary of BLM administered lands. These partitions are classified based on the physical and biological capability of the site to support and produce forest products on a sustained yield basis, using operational management practices.

Hydrological Condition

The proposed commercial thinning, density management thinning and red alder conversion units in this EA are located within the North Fork Coquille Watershed. The proposed project is located in the Cherry Creek Middle Lost Drainages within the Middle Creek Subwatershed. Cherry Creek drainage is a Tier 1, Key Watershed. Watershed in this hydrology section refers to the 5th field, North Fork Coquille Watershed.

Stream Flow

The Watershed has a Mediterranean type of climate with cool, wet winters and warm, dry summers. The hydrology of the area is driven by precipitation in the form of rain, and the volume of stream flow closely parallels the precipitation pattern. This is due to a high drainage density, low bedrock permeability, coarse textured and shallow soils, high precipitation, and steep slopes (NFC WA 2001, Ch. 4 p.1).

From 1960 to 1980, the average annual precipitation ranged from about 80 inches near the northeast boundary of the Watershed to less than 60 inches around the mouth of the North Fork Coquille River (Froehlich *et al.* 1982). About 80% of the precipitation falls from October to March, with half occurring between November and January. A BLM precipitation gage in lower Cherry Creek, near McKinley, Oregon at an elevation of 600 feet recorded an average annual rainfall of 57 inches from 1985 to 1993. Average dry season precipitation (May-September) at this site for the same period was 0.28 inches (Coos County Water Resource Department Records 1994). Winter rainfall can be steady for several days and intense rain periods can produce 4 to 6 inches of rain in 24-hours (Townsend *et al.* 1977, p. 33).

Peak flows in the Watershed are largely dependent on the duration and intensity of rainfall (NFC WA 2001, Ch. 4 p. 9). Thus, high flows occur during the winter months. Low stream flows occur from July to October and are characterized by extremely low base flows and, occasionally, dry stream channels. Land management practices in the Watershed, including timber harvest and road building, have potentially influenced flow magnitude and timing in some streams.

Transient Snow Zone

Timber harvest in the Transient Snow Zone (TSZ) has the potential to increase peak flows. The TSZ is defined as land between 1800 and 5000 feet in elevation. Higher than normal peak flows can occur as a result of warm, rain on snow events in the TSZ (Harr and Coffin, 1992). Timber harvest can provide openings where snow accumulates. Warm rain-on-snow events can melt this increased snow pack quickly and create higher than normal flows. However, only about 3.4 percent of the Watershed, and none of the proposed project area, is located above 1800 feet in elevation. Portions of the area may receive occasional snow, but the quantity and duration of accumulation do not normally produce rain on snow events (NFC WA 2001, Ch 4. p. 1). Therefore, the proposed project is not likely to affect peak flows by rain on snow events, and TSZ effects will not be discussed further in this analysis.

Water Quality

Water quality standards are determined for each water body in the state by the Oregon Department of Environmental Quality (ODEQ). These standards are designed to protect each water body for its most sensitive beneficial use (Miner 1996, p. 1). Beneficial uses of surface water in the Watershed include habitat for resident and anadromous fish, habitat for other aquatic life, water for terrestrial wildlife, water contact recreation, irrigation, livestock watering, and private municipal and domestic water supply (NFC WA 2001, Ch. 7 p. 1). The most sensitive beneficial use of surface water in the Watershed is habitat for resident and anadromous fish and other aquatic life.

Water bodies that do not meet water quality standards are placed on the states' 303(d) list as Water Quality Limited (ODEQ 1998). High water temperatures and elevated fine sediment levels are the primary non-point source pollutants of surface water in the watershed (ODEQ 1988). Both high temperatures and excessive sedimentation can cause severe impacts on aquatic life, particularly fish and invertebrate reproduction. Reaches of the North Fork Coquille River and four of its tributaries are listed as Water Quality Limited by ODEQ (see table below).

303(d) listed stream miles in the North Fork Coquille Watershed			
Stream	**Miles**	**Listed Parameters (miles)**	
		Temperature	Bacteria
North Fork Coquille	44.23	44.23	18.46
Middle Creek	24.25	24.25	----------
Cherry Creek	3.76	3.76	----------
Alder Creek	3.14	3.14	----------
Woodward Creek	7.56	7.56	----------

Stream Temperature

All of the reaches above are listed for exceeding the 17.8▾C temperature standard during summer (ODEQ 1998, attachment A). Elevated stream temperatures are primarily due to a lack of stream shading, a high width to depth ratio and/or low summer flows (Moore and Miner 1997). All of these conditions result in additional stream heating. A lack of shade allows an increase in solar radiation at the stream surface. A high width/depth ratio allows more surface area to be impacted by solar radiation per volume of water. Lower flows or volume contribute to elevated stream temperatures since the change produced by a given amount of heat is inversely proportional to the volume of water heated (Brown 1983). Some reaches of the affected streams in the proposed project area are subject to all of these conditions. Other perennial streams in the Watershed may also have elevated summer temperatures and potentially contribute to high temperatures in reaches of the North Fork Coquille River and the other listed streams. Some of the units in the proposal are adjacent to perennial streams.

Sediment

Sediment input to stream channels is a result of both natural and management related erosion processes. According to Townsend *et al.* (1977, p. 33), "landslides such as debris avalanches and slumps which produce debris and sediment in the streams" are commonly associated with intense winter storms. Most sediment is delivered to the stream channel by gravity and flowing water. Primary sediment sources include landslides, stream banks and roads. There are no streams currently listed by ODEQ as impaired by excess fine sediment in the Watershed. However, due to past management activities, excess fine sediment and the resulting degradation to water quality and aquatic life is a major concern. According to MacDonald (1991), "An increased sediment load is often the most important adverse effect of forest management activities on streams." Based on this premise, and the state's assessment of non-point sources (ODEQ 1988), there is an increased potential for stream reaches in the Watershed to be impaired by excess fine sediment.

According to Reid (1981), Reid and Dunne (1984), and others, forest roads can be a major contributor of fine sediment. Sediment delivery to the drainage network may be increased by down cutting of ditch lines and by erosion of unprotected road surfaces from overland flow. Landslides can occur when road drainages are concentrated on unstable or erosive slopes. In addition, failure of inadequate road/stream crossings has the potential to increase sediment input to the streams.

The Watershed, including the proposed project area, has roads with one or more of the above concerns. Management recommendations for the Watershed include decommissioning, maintaining or improving roads to reduce their detrimental effects. Cherry Creek drainage is a Tier 1, Key Watershed. Management recommendations for Cherry Creek include reducing existing road mileage (RMP ROD, pp. 7-8). Average road density in the Watershed is about 4.8 miles per square mile. Road Density in the Cherry Creek, Tier 1 watershed is about 4.5 miles per square mile. Several existing roads associated with the proposed project show evidence of surface erosion,

inadequate drainage, inadequate stream crossings or unstable cut-banks and fill slopes. Some of these roads are likely causing an increase in sediment delivery to their respective drainage networks.

Bacteria
The North Fork Coquille River is listed from its mouth to Middle Creek, about 18.5 miles, for elevated levels of bacteria. Elevated levels of bacteria in the lower portion of the North Fork Coquille River are not likely to be created by forest management, or affected by the proposed project, and will not be discussed further in this analysis.

Channel Condition and Large Wood
Middle Creek, Cherry Creek and other streams in the project area are deficient in large wood and are down cut to bedrock in several reaches. Lack of large wood and its disassociation from the floodplain have allowed increased stream velocities to continually scour stream channels and remove substrate during high flows. The proposed project area, judging from its position in the Watershed and present riparian condition, has historically been dependent on large wood to help reduce stream energy, aggrade the stream channel, and allow floodplain development.

Approximately 42.8 miles of stream surveys were conducted in the Middle Creek Subwatershed by Oregon Department of Fish and Wildlife (ODFW 2001) between 1994-1999. Results of the surveys show that most stream reaches surveyed had a "desirable" volume of woody material. However, most of the surveyed reaches had a lack of key pieces of large wood that can serve to reduce stream energy, capture substrate, stabilize streambeds and banks, aggrade the stream channel and re-establish a connection with the floodplain. Large, key pieces of wood capture other woody material and are less likely to be washed downstream. "Key" pieces were defined as those greater than 60 cm in diameter and greater than 10 m long. Only about one mile or 2.4% of the reaches surveyed were found to have "desirable" numbers of key pieces (>3 pieces/100 m). Approximately 35.4 miles or 82.7% were found to be in the "undesirable" category (<1 piece/ 100 m). ODFW defines "desirable" and "undesirable" habitat conditions based on values of surveys from other forested reference areas (ODFW 1999, p. I- 47).

Most riparian areas in the Middle Creek Subwatershed have been harvested in the past, and ODFW stream surveys also found conditions for potential recruitment of large wood to be "undesirable" in most reaches surveyed. Riparian conifers greater than 20 inches in diameter were inventoried in an area 30 meters from both sides of the channel. "Undesirable" conditions were defined as reaches with less than 150 of these trees per 1000 feet of stream length. Approximately 42.5 miles or 99% of the reaches surveyed were found to have "undesirable" numbers of these larger trees that could contribute large wood to the stream channels.

Aquatic Habitat/Fisheries, Including T & E Species

Fish Species
The following lists the fish species known or believed to occur in the Middle Creek subwatershed. Other than the salmonids listed, the occurrence of the fish species in relation to the proposed project reaches is not known, but it's likely that they occur in the lower main stem portions of Middle Creek and Cherry Creek.

Salmonids	Other Fish Species
chinook salmon	threespine stickleback
coho salmon	speckled dace
chum salmon	largescale sucker
steelhead trout	Pacific lamprey
resident and sea-run cutthroat trout	western brook lamprey
	prickly sculpin
	reticulate sculpin

The North Fork Coquille 5th field watershed is located within the Oregon Coast Evolutionarily Significant Unit (ESU), which extends south of the Columbia River and north of Cape Blanco. The following summarizes the Endangered Species Act (ESA) status of salmonids within the ESU:

- The Oregon coast population of coho salmon was listed as "threatened" on August 10, 1998, and Critical Habitat was designated February 16, 2000. However, in September 2001, the US District Court for the District of Oregon (Judge Hogan) determined that the listing was unlawful and was set aside as being arbitrary and capricious because NMFS' decision arbitrarily excluded hatchery spawned coho. As a result of this decision, the Oregon coast coho ESU was removed from ESA protection. NMFS decided to not appeal the decision and is presently undertaking a complete review of its policy with regard to ESA classification of hatchery fish under the ESA.

  On December 9th, 2001, the 9th Circuit Court of Appeals in San Francisco over ruled Judge Hogan's decision and reinstated the listing for coastal coho.

- Steelhead trout were listed as a "candidate[1]" species on March 19, 1998. Critical habitat is not designated for candidate species.

- On April 5, 1999 the Oregon coast coastal cutthroat trout ESU was designated as a "candidate" for listing due to concerns over specific risk factors. This species is under the jurisdiction of the U.S. Fish and Wildlife Service.

If any other fish species are listed prior to the implementation of the proposed action, they will be referred for informal or formal consultation with the U.S. National Marine Fisheries Service (NMFS) in accordance with Section 7(a) of the Endangered Species Act of 1973 as amended.

Essential Fish Habitat

Regardless of the listing status under the ESA, under section 305 of the Magnuson-Stevens Act, Federal agencies which authorize, fund or undertake any action which may adversely affect Essential Fish Habitat[2] (EFH) are required to consult with NMFS in order to receive recommendations on measures necessary to conserve and enhance EFH where applicable.

Distribution of Special Status Fish Species in the Project Area

There are approximately 340 miles of streams in the Middle Creek sub-watershed, of which 195 miles, or 57%, are on BLM administered lands. A total of 74 stream miles are known to be fish-bearing (NFC WA, Ch. 8 p. 33). However, few of the streams within and immediately adjacent to the project areas are fish-bearing because they are relatively high-gradient and small in size. The majority are 1st to 3rd order streams. There are no fish-bearing streams within the unit boundaries of the 7 units in the proposed action. No units have fish-bearing streams along their periphery. Table B in Appendix I describes the proximity of fish-bearing streams to each of the project areas.

Fish and Riparian Reserve Habitat

Stream habitat inventories conducted on the lower reaches of Middle Creek and it's tributaries near the proposed projects indicate that habitat conditions are "undesirable" in comparison to Oregon Department of Fish & Wildlife's Steam Channel and Riparian Habitat Benchmarks. This is largely due to the fact that lower Middle Creek and Cherry Creek pass through lands that have been in agricultural use for decades, and main stem Middle Creek had several splash dams in operation from the early 1900's to the 1930's (NFC WA, Ch. 8 p. 9). General locations of the splash dams shows that they were scattered along the first 12 miles of Middle Creek and possibly one up Cherry Creek. There was also a mill with an impoundment in operation on Middle Creek in the vicinity of the mouth of Cherry Creek.

In comparison to other fish-bearing stream reaches in the subwatershed, in-stream and riparian habitat are in better condition in the upper reaches of Cherry Creek upstream of the agricultural lands and splash dam site (NFC WA, p. 39). According to ODFW's stream habitat inventory data, both the North Fork and South Fork of Cherry Creek exceed the habitat benchmark values of 30 m^3 and 3 key pieces of large woody debris (LWD) per 100 meters of stream, which is classified as "desirable" habitat conditions; no other creeks within the sub-basin exceed the key piece benchmark. The LWD values for the North and

[1] It is BLM policy to treat proposed and candidate fish species as though they were listed, and to conduct informal conferencing with NMFS on actions that may affect special status species or their habitats.

[2] Essential Fish Habitat (EFH) is defined to include those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity. Analysis and discussion in this EA concerning fish habitat and water quality pertain to EFH.

South Fork of Cherry Creek reflect the general limited timber harvest activities that have occurred in this area on BLM administered lands (NFC WA, Ch. 8 p. 39).

Based on field reviews and aerial photo interpretation, the existing Riparian Reserves[3] within the proposed project units appear to be providing adequate shade to protect water temperatures over the majority of the project area. With the exception of some areas dominated by alder, sources of future woody debris for future recruitment along stream channels are intact over much of the project area. With the retention of Riparian Reserves in accordance with the Northwest Forest Plan, and appropriate active management to restore conifer where it existed historically, conditions will likely improve through time; especially in smaller headwater streams that were not "buffered" when the stands were harvested in the past.

In the project area there are approximately 12 acres of alder dominated stands within Riparian Reserves proposed for conversion back to conifer-dominated stands. Red alder (*Alnus rubra*) is a pioneer species that establishes rapidly in openings created by forest disturbance; it commonly invades newly bare soils after landslides, logging, or fire (Niemiec et al 1995). Although alder is common at low elevations along the Pacific coast, its abundance is believed to be substantially higher than it was in the past; historical inventories indicate that the abundance of red alder along the Pacific coast has increased about 20-fold since the 1920's (Niemiec et al 1995). The large area of hardwood-dominated riparian forest in the Coast Range today is testimony to the reproductive capability of red alder and its ability to dominate sites for long periods (Emmingham et al. 2000).

Alder does produce some woody debris, which is recruited by competition mortality from among the smaller diameter trees (intermediate and suppressed crown classes) (Peet; Christensen 1987). However, alder's value for in-stream structure or terrestrial down wood habitat is short term because alder is not resistant to decay, and is comparatively weak, allowing it to more readily break under the force of high stream flows compared with Douglas-fir (Niemiec et al 1995). One study found red alder, when pulled over into a stream, began losing structural integrity after three years (Keim et al 2000). Input from decadent alder would likely persist for even less time.

The 58 Riparian Reserve acres proposed for density management thinning are currently stocked with conifer, primarily Douglas-fir, at densities ranging from about 190 to 840 trees per acre. On average, densities this high are likely higher than would occur under natural conditions, and the current stand conditions are not on a trajectory to develop large woody material of key piece size. In a study of old-growth stands in the Coast Range of western Oregon, regeneration of the sites studied occurred over a prolonged period, and trees grew at low density with little self-thinning. In contrast, after timber harvest, young stands develop with high density of trees with similar ages and considerable self-thinning (Tappeiner 1997). It's possible that old growth conditions develop only from low-density stands (Emmingham 1997). However, the primary difference between natural stands and forest plantations is the timing of seedling establishment. When natural seedlings become established over a period of several years rather than a single day, the principle of who got there first prevails. Seedlings that establish early in stand re-establishment have an advantage of capturing site resources and grow "as if" they were at low densities. Actual numbers of trees per acre may be much higher than planted and pre-commercially thinned plantations. In addition, relatively short lived species such as red alder, bitter cherry, and chitum would completely disappear from a well-stocked old-growth stand but would have influenced crown development by leaving clean boles on large Douglas-fir.

Wildlife, Including T & E Species

Threatened and Endangered Wildlife Species Occurrence and Habitat

There are no known threatened or endangered species nest sites or activity centers within the proposed sale units. Several of the units are within distances that would require seasonal or daily timing restrictions on harvest related activities. None of the proposed units are within designated spotted owl or marbled murrelet Critical Habitat Units. There are no known threatened or endangered species nest sites or activity centers within the proposed sale units. There are no known Bald Eagle nest sites, roosts, or perches within 800 meters of any of the proposed units.

[3] Riparian Reserve widths for fish-bearing streams in the Middle Creek subwatershed are equal to the distance of two site-potential tree heights (440 foot slope distance) on each side of the fish-bearing streams, and one site-potential tree (220 feet each side) for non-fish bearing perennial streams and intermittent streams.

Survey and Manage Wildlife Species and Habitat
Surveys would not be required for blue-gray tail-dropper, and papillose tail-dropper or Del Norte salamander because these species have been removed from the Survey and Manage list. The Oregon megomphix has been placed in a category that does not require pre-disturbance surveys (S&M ROD and S&G) *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* USDA-USDI 2001 pp. 18-19) and Implementation of 2001 S&M Annual Species Review (BLM Instruction Memorandum OR-2002-064). There are no known Oregon megomphix sites in any of the proposed units.

Oregon Red Tree Vole has been placed in a category that does not require pre-disturbance surveys, however known sites would be managed (S&M ROD and S&G, pp. 18-19) and Implementation of 2001 S&M Annual Species Review (BLM Instruction Memorandum OR-2002-064).

There are no known caves, mines, or abandoned wooden bridges or houses, that are used or could be used as bat roosts within any of the units.

Other Wildlife Species and Habitat
There are no known unique or special habitat areas within the proposed units. There are very few large snags in any of the units.

The proposed harvest areas are approximately 29 to 42 year-old stands considered a closed sapling-pole-sawtimber forest condition. These stands have canopy closure exceeding 60%, often reach 100%, which allows very little light available for ground vegetation. Stands of this type are used by approximately 36 species of wildlife for the primary purposes of feeding and/or breeding. An additional 92 species of wildlife are known to use stands of this type secondarily for feeding and/or breeding (Brown 1985). The species composition includes large mammals such as bears, deer, elk, coyotes, bobcats and mountain lions. Smaller mammal species include: bats, shrews, moles, weasels, squirrels, chipmunks, ground squirrels, porcupines, and mountain beaver. Bird species found in habitats such as these include: Cooper's and sharp-shinned hawks, grouse, owls, and many species of songbirds. Several species of salamanders, frogs, and snakes also use closed sapling-pole-sawtimber stands such as the proposed harvest area.

The wildlife species that may be found in the proposed units are included in a complete list of wildlife species known to occur on the Coos Bay District. This list is in Appendix T of the Final Coos Bay District Proposed Resource Management Plan and Environmental Impact Statement (RMP FEIS) Volume II. This list also indicates the status of each species. There are several special status birds, mammals, and amphibian species that could occur in the proposed units. Special status includes Bureau Sensitive, Bureau Assessment, and Bureau Tracking categories. An explanation of these categories may be found in the footnote following Table 3-32 in the RMP FEIS, Volume I.

The wildlife species that may be found in the proposed units are included in a complete list of wildlife species known to occur on the Coos Bay District. This list is in Appendix T in the RMP FEIS, Volume II. This list also indicates the status of each species. There are several special status birds, mammals, and amphibian species that could occur in the proposed units. Special status includes Bureau Sensitive, Bureau Assessment, and Bureau Tracking categories. An explanation of these categories may be found in the footnote following Table 3-32 in the RMP FEIS, Volume I.

Recreation Resources

The proposed McKinley Camp recreation site (Sec. 21, T. 27 S., R. 11 W., W.M.) Coos County's Cherry Creek Park (Sec. 3, T. 28 S., R. 11 W., W. M.) and BLM's Big Tree recreation site/Cherry Creek Research Natural Area (Sec. 18, T. 27 S., R. 10 W., W. M.) are both located more than one-half mile from any of the proposed units.

The area encompassing the project area offers opportunities for adventure driving, hiking, hunting, and other dispersed recreational activities. The use of forest access roads for recreation remains essential in this region because of steep terrain and distance from towns.

Cultural Resources and Native American Religious Concerns

A Class I inventory review of project documentation and records check shows no known cultural resources in the immediate vicinity of these proposed project areas.

Air Quality, Forest Fuels, and Fire

The project areas, and the Middle Creek subwatershed in general, have had a long and varied fire history dating back as far as the mid 16th century and as recently as the mid 20th century. Since then, fire suppression activities have all but eliminated natural fire from the subwatershed. Harvest units on both private and BLM land have received some form of site preparation or fuels treatment following harvest operations in order to prepare the site for reforestation by the reducing fuel/slash loadings and/or the establishment of competitive non-commercial species. These treatments are primarily broadcast burning, hand/machine piling and burning, and herbicide applications. The resulting effect is stands which are uniform, densely stocked and lacking in diversity.

Stands that were not successfully regenerated or which were left to natural regeneration are now dominated by red alder and also share similar characteristics to successful regenerated stands such as uniformity, high density and lack of diversity.

Many of the project areas have a history of intensive use by the public for recreational activities, primarily hunting. These activities often occur during periods of high fire danger.
Some proposed harvest activities are in managed rural interface areas, (BLM managed land within 0.25 mile of private lands zoned for 1- to 5-acre, or 5- to 20-acre lots).

Solid and Hazardous Waste

No solid waste materials have been found on the project area other than small local household garbage sites.
No hazardous waste material has been found on the project area.

Special Management Areas

Wilderness Areas
There are no Wilderness Areas in or near the project area.

Wild and Scenic Rivers
There are no Wild or Scenic Rivers in or near the project area.

Areas of Critical Environmental Concern(ACEC)
There are no ACECs in the project area. The Cherry Creek ACEC (Research Natural Area) and the China Wall ACEC are two ACECs in the Middle Creek subwatershed. Distance and topographic features separate the units in the proposed action from the ACECs.

Environmental Justice

The proposed areas of activity are not known to be used by, or are disproportionately used by, Native Americans, or minority, or low-income populations for specific cultural activities, or at greater rates than the general population. This includes their relative geographic location and cultural, religious, employment, subsistence, or recreational activities that may bring them to the proposed areas.

Energy Exploration, Development, Distribution, and Conservation

A review of the proposed project has been completed for potential adverse energy impacts. This has been completed to satisfy and in accordance with Bureau of Land Management Instruction Memorandum No. OR-2002-037. All actions are to be reviewed to determine if they would impact energy resources on or across BLM lands in terms of access, exploration, development, transportation, and/or production. Energy resources include oil and gas, geothermal, coal, wind, hydroelectric, and fissionable resources.

Chapter 4 - Environmental Consequences

This chapter is organized by resources and describes the expected impacts as they relate to the alternatives.

Critical Elements with No Impacts

Analysis of the No Action Alternative and the Proposed Action has shown no impacts on the following critical elements of the human environment:

1. Areas of Critical Environmental Concern (ACEC)
2. Farm lands, prime or unique
3. Flood Plains
4. Wild and Scenic Rivers
5. Wilderness values

Impacts on Vegetation, including Sensitive Species

NO ACTION ALTERNATIVE

Conifer overstory

The trees in the stands would continue to grow, but vigor would decrease with age due to overcrowding. Differentiation would occur over time with the more dominant trees suppressing the less vigorous trees. Suppression induced mortality would occur in the less vigorous intermediate and suppressed crown classes.

Suppression mortality kills the smaller trees in the stand and will provide snags and down wood, but they will be small in size and will last a relatively short time. Few large trees die because of competition (Peet; Christensen 1987). Instead, insect, disease, mechanical, or weather related injury or disturbance cause most mortality among large trees. High stand densities would delay attainment of large diameter trees and consequently also delay attainment of large diameter down wood and snags. Stand projection simulations suggest it will take an un-thinned stand 200 years to regularly produce large diameter forest structure associated with late-seral stands. In contrast, Tappeiner *et al.* (1997) found that many Coast Range old growth stands developed under low stocking densities and developed large diameter trees capable of providing large structure by the time those trees were 50-years old.

Closely spaced trees have small crowns and a correspondingly small root mass. The small individual tree root mass makes trees in dense stands vulnerable to blowdown around where gaps form in those stands, and on the lee side of sharp ridges and stand edges (NFC WA, Ch. 14, p. 5). Untreated stands remain in the stem exclusion stage longer than thinned stands. The high competition and low light penetration into these stands will result in low crown ratios and an exclusion of an understory stand (NFC WA, Ch. 14, p. 11).

Alder

In the absence of a disturbance, the alder stands with a salmonberry understory will become a brush field when the alder dies (Newton and Cole, 1994). Salmonberry brush fields are a “climax community” that are unable to contribute coarse woody debris to the Riparian Reserve. Trees cannot establish in a salmonberry brush field without a disturbance that frees growing space (Emmingham, Hibbs 1997; Hemstrom, Logan 1986) as cited in Emmingham et. al (2000).

Understory
Understory brush species, salmonberry, elderbery, vine maple and swordfern, will continue to live within the red alder stands and then flourish as the alder stands begin to decay, precluding establishment of conifer.

S&M and Special Status Plants
Under the No Action Alternative, there will be no short-term change to the existing habitat available for these species in the subwatershed.

Port-Orford-cedar
There is no known Port-Orford-cedar within any of the harvest units in the proposed action or their associated haul routes. There is no effect on Port-Orford-cedar or spread of the root rot fungus, *Phytophthora lateralis*, by selection of the no action alternative.

Noxious Weeds:
Under the No Action Alternative, the current rates of introduction and spread are likely to continue as a result of private and public use of the road systems in the short term. The cumulative effect of increased shading of the road systems over time from maturing forests would result in a decrease in the numbers and vigor of noxious weeds currently present. It may slow in the long term but residual plants and seeds would still be available to populate any disturbed ground for many years because the seeds of broom and gorse are viable for 80+ years. The control and treatment of gorse, tansy, and to some extent the brooms would continue on public lands as funding and priorities allow.

PROPOSED ACTION

Conifer overstory
Thinned areas would result in increased tree growth and vigor of individual trees and would eventually produce larger healthier trees. In the long term, meaning several decades, there would be an increase in the quality of wood products available in the GFMA and larger trees would be available in the RR for future sources of large woody material and snags. By removing the less thrifty trees in the thinning area there would be a short-term reduction of suppressed and intermediate trees for potential future small snags and down logs. Commercial thinning in the GFMA can delay culmination of mean annual increment and where timing of final harvest is based on culmination of mean annual increment, this has the effect of lengthening rotations for regeneration harvests.

Minor damage to bark of some residual trees is expected during harvest activities. A seasonal restriction for yarding during the spring when bark is loose is expected to minimize residual tree damage. The number of new snags created from injured trees is unknown, but is estimated at 1 to 2 per acre. There is only slight chance that black stain disease (*Leptographium wageneri*) could infect some damaged trees resulting in additional small snags. However, most trees in the project area are older than 30 years and not considered to be susceptible to black stain (Hessburg et. al. 1995).

Depending on site conditions and pretreatment root mass of the leave trees, thinning may result in a short-term increased risk of blowdown. As the crown size increases, with the corresponding increase in root mass and bole thickness, the risk of blowdown or snap out decreases. This results in a greater resistance to blowdown for the stand as a whole compared with its pretreatment condition. (NFC WA, Ch. 14, p. 5)
Intensive forest practices used to develop a healthy overstory, such as planting, manual brush cutting, pre-commercial thinning, and fertilization, are expensive. These investments are recoverable on the Matrix lands through commercial thinning and final harvest. They are partially recoverable on reserved lands where there is density management treatment that includes wood removal, and unrecoverable where there is no wood removal associated with managing habitats.

Injury to reserved trees from harvest activities is likely to occur. Helicopter operations may cause crown damage in some reserved trees. Many of these damaged trees could eventually develop into snags and increased wildlife habitat.

Red alder
The removal of red alder from the upland areas of the riparian reserve and from the matrix areas, followed by site preparation, planting of conifers, follow up maintenance would convert the alder stands to conifer stands. Alder that is left

along streams after harvest would provide a seed source for the regeneration units. It is expected that follow up manual stand maintenance would be required one to three times to control alder until the conifers are established.

Understory
From a research paper by Bailey and Tappenier (1998): Newton and Cole (1987) demonstrated that thinning dense stands can encourage development of overstory structure similar to that of old growth forests described by Franklin and Spies (1991), with concomitant benefits for species associated with older forests (McComb et al. 1993). Thinning young stands may also stimulate development of understory structures characteristic of old-growth forests through a combination of: (a) stimulating tree regeneration in the understory; (b) increasing the survival and growth of suppressed and intermediate trees, both of which would lead to a multi-storied stand; (c) fostering the development of diverse shrub layers.

Harvesting the stand will increase its vulnerability to infestation by exotics, which thrive in the resulting disturbed soils and brighter light conditions. However, the canopy will eventually close, shading out weedy species. Some herbaceous species and epiphytes may have reduced vigor from the altering of the microclimate, while some species of herbs and shrubs will flourish from the increased sunlight. Within5 to 8 years, as the forest grows, canopy shade conditions will come to approximate the current condition.

S&M and Special Status Plants:
It is probable that thinning the stand will increase habitat suitability for many species of epiphytic lichens and bryophytes. Current knowledge indicated that dense stands in the stem exclusion stage do not provide adequate airflow and light to provide habitat for, or be inoculated by, most species of lichens and bryophytes. High priority known sites of S&M and Special Status plants will be managed to maintain a reasonable likelihood of their persistence.

Port-Orford-cedar:
There is no known Port-Orford-cedar within any of the proposed harvest units or along any of the proposed haul routes. There is no effect on Port-Orford-cedar or spread of the root rot fungus, *Phytophthora lateralis*, by selection of the proposed action alternative. The project design features require vehicle washing for all logging and road construction equipment. This is also effective in preventing the introduction of any fungal spores, including those of the Port-Orford-cedar root rot fungus. Even if the spores of *Phytophthora lateralis* were deliberately introduced, there is no host present which would allow the spores to persist in the area of the proposed projects.

Noxious Weeds
Vehicle and equipment washing and re-vegetating disturbed ground should prevent or reduce noxious weed infestations by minimizing site conditions favorable for establishment of noxious weeds. Follow up monitoring would prioritize eradication of any existing or newly introduced noxious weeds. Treatment of existing weeds would set back seed production and reduce the chance of spread during management activities. Re-vegetation of disturbed sites also helps minimize germination of weed seeds due to competition. The cumulative effect should be a reduction or eradication of brooms in these areas due to past treatments, treatments that would occur as a result of the Proposed Action, and additional treatments that would occur as part of regeneration monitoring. Treatments of existing and/or newly introduced noxious weeds would occur according to established priorities and funding.

Impacts on Soils and Geological Formations

NO ACTION ALTERNATIVE

Geological Formations
Direct and Indirect Impacts:
This alternative would have minimal direct and indirect impacts on existing geologic formations. Continued development of the natural system would not impact the underlying stratigraphy except in the aspects of geologic time. Frequency and extent of large-scale landslides would not be impacted by this alternative.

Cumulative Impacts:
This alternative would have minimal cumulative impacts on existing geologic conditions. Continued development of the natural system would not impact the underlying stratigraphy except in the aspects of geologic time. Large-scale landslides would not be impacted by this alternative. Landslides and debris flows are part of a natural system and will continue at the present rate.

Soils
Direct and Indirect Impacts:
This alternative would have minimal impact on existing soil conditions. No additional disturbance would occur to soils.

Cumulative Impacts:
The regeneration of a forest soil O-Horizon would continue. Slow decompaction of historically impacted soils would also continue with natural process (root growth, animal burrowing, accumulation and development of a O-Horizon, etc.). Through extended time, these processes may return the soils to a pre-disturbance condition.

PROPOSED ACTION

Geological Formations
Direct and Indirect Impacts:
This alternative would have minimal direct and indirect impacts on existing geologic formations. Continued development of the natural system would not impact the underlying stratigraphy except in the aspects of geologic time. Project activities, likewise, would not have short or long term impacts to the regional geology. Large-scale landslides would not be impacted by this alternative. The removal of select trees should not decrease slope stability, as the root systems would be intact.

In some cases, the intersection of dip planes or the reactivation of currently inactive slides by road construction may possibly create localized landslides and/or debris flows. However, maximizing the use of existing road systems and minimizing new road construction (0.6 miles), in stable locations, for this alternative would reduce the possibility of these impacts. It should be noted that in addition to the minimal amount of total new road construction, approximately 2.7 miles of road would be decommissioned.

Cumulative Impacts:
This alternative would have minimal cumulative impacts on existing geologic conditions. Continued development of the natural system would not impact the underlying stratigraphy except in the aspects of geologic time. Project activities, likewise, would not have short or long term impacts to the regional geology. Large-scale landslides would not be impacted by this alternative. The removal of select trees should not decrease slope stability, as the root systems will be intact.

Soils
Direct and Indirect Impacts:
Cut-to-length harvester operations may create localized compaction of exposed mineral soils. However, if the harvesting is done as recommended, with designated spacing of skid trails, there should be little compaction damage. The main requirements would be that the operator make sure that the equipment is traveling over a bed of slash, that travel over exposed mineral soil be avoided to the extent feasible, the number of passes be minimized to the greatest extent feasible, and to utilize existing compacted skid roads for main pathways. If compaction is avoided, there would be no reduction in surface water infiltration or subsurface water movements.
It should be noted that, according to Allen (1997), the use of slash under skidding does not eliminate compaction. However, studies have shown that such techniques may reduce the degree and depth of compaction. Allen (1997) further states that existing compacted routes are not further compacted by additional passes of equipment.

Cable logging will create temporary localized surficial ground disturbance by movement of soil. However the effect would be temporary, with vegetation, especially in a thinned open canopy system, reclaiming the impacts within one to a few growing seasons.

Road construction along slopes may create minor soil failures. However, maximizing the use of existing road systems and minimizing new road construction (0.6 miles), in stable locations, for this alternative would reduce the possibility of these impacts.

Some soil erosion from cutbank sloughing and from the road surface can be expected, especially from heavy rains during the first winter following construction, harvest and site preparation activities. It is not anticipated that these sediments would enter the streams. Surface erosion generated during the harvest, road and landing construction would migrate very short distances before being filtered by duff and woody materials. Seeding and mulching of the bare soils would minimize the impacts created by road and landing construction.

Renovation of existing roads would consist of roadside brushing, reshaping, and restoring the surface where necessary, maintaining or improving drainage structures, and applying rock surface where needed. Currently low- or no-maintenance roads used by the project would be upgraded to current standards. Installing water bars and applying other BMPs should be included as part of the decommissioning after harvest activities.

Impacts on Hydrological Conditions

NO ACTION ALTERNATIVE
The proposed commercial thinning, density management thinning, red alder conversion, road building, road renovation and road decommissioning described in the proposed action would not take place.

Stream Flow
Flow timing and magnitude would remain unaffected by the no action alternative because no thinning, density management or alder conversion would occur and none of the proposed road renovation or decommissioning projects would be implemented. Annual yield, low flows, and peak flows will be unaffected by maintaining present forest conditions. However, roads proposed in the project for renovation or decommissioning would continue to potentially affect the magnitude and timing of stream flows due to their capacity to extend the drainage network (see page 40: Chapter 4, PROPOSED ACTION, *New Road Construction*, Stream Flow). Riparian areas dominated by stands of alder will potentially continue to reduce low summer flows (see page 39: Chapter 4, PROPOSED ACTION, *Alder Conversion*, Stream Flow).

Water Quality

Stream Temperature
Stream temperatures on Middle Creek, Cherry Creek and other streams in the proposed project area would not be affected in the short-term as no density management thinning would take place in Riparian Reserves. Riparian shade will continue to increase on those reaches that have not yet reached or matured to their potential condition. In the long term, however, dense second growth stands in Riparian Reserves would continue to grow at a slower rate than if thinned. This would result in unfavorable height to diameter ratios that would increase the risk of blowdown (Smith 1962, p. 422), and subsequent exposure of the stream to solar heating. In addition, the un-thinned condition would delay establishment of understory trees and shrubs with their associated multi-canopy layers that could provide shade in the event that some or all of the overstory shade is lost due to a catastrophic event (Levno; Rothacher 1969 cited in Adams; Ringer 1994). Lowered summer flows from dense stands of alder in riparian areas would potentially continue to help cause elevated summer temperatures (see page 24: Chapter 3, Water Quality, Stream Temperature; and page 36: Chapter 4, PROPOSED ACTION, *Commercial Thinning and Density Management*, Stream Flow).

Sediment
There would be no short-term soil displacement or potential for sediment delivery to streams as a result of harvest operations. Existing roads identified as likely adding sediment to streams would not be renovated or decommissioned at this time. Therefore, these roads would continue to increase fine sediment delivery to stream channels (see page 37: Chapter 4, PROPOSED ACTION, *Commercial Thinning and Density Management*, Water Quality

Channel Condition and Large Wood

Trees within Riparian Reserves in the proposed project area would continue to grow. However, the trees in dense second growth stands would grow at a slower rate than if thinned due to competition for limited sunlight, nutrients and water. Future recruitment of large woody debris in terms of amounts, longevity and functional capabilities would be diminished due to reduced growth in overstocked riparian stands. Without thinning it would take 10-40 years longer, depending on site class, for live trees to be available as large wood (defined as 20" diameter or greater) for interaction with the streams. Riparian areas and adjacent uplands dominated by alder would continue to prevent growth of conifers that could potentially contribute large wood to stream channels. Large wood is a critical element for maintaining proper channel function (see page 38: Chapter 4, PROPOSED ACTION, *Commercial Thinning and Density Management*, Channel Condition and Large Wood).

PROPOSED ACTION

1. Commercial Thinning and Density Management

Approximately 179 acres of dense, second growth stands in the General Forest Management Area would be thinned as a result of the proposed project in order to improve forest health and encourage growth of larger trees. In addition, approximately 58 acres of Riparian Reserves would be thinned in order to meet Aquatic Conservation Strategy objectives. The Aquatic Conservation Strategy is a portion of the Northwest Forest Plan developed to restore and maintain the ecological health of watersheds and aquatic ecosystems on public lands. The RMP ROD (p. 13) states that we should "Apply silvicultural practices for Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives."

The combined thinning and density management thinning units under this proposed action are located in two drainages of the North Fork Coquille Watershed. These drainages and their respective commercial thinning and density management thinning areas are listed in the table below. Values are approximate and are based on GIS data.

Location of Thinning and Alder Conversion Areas by Drainage

Drainage	Total BLM Acres	Thinning Acres	Alder Conversion Acres	Percent of Drainage
Cherry Creek	8,330	143	30	2.1
Middle Lost	4,150	94	12	2.6

Current vegetative age class distribution indicates 25.7% of BLM lands in the North Fork Coquille Watershed are in the 0-30 year old age class based on 1997 GIS derived data (NFC WA 2001, Ch. 5 p. 4). Information on age class for private lands was unavailable. Approximately 0.6% of BLM lands or 0.2% of the Watershed would be thinned.

Stream Flow

(a) Annual Yield

Thinning has the potential to affect annual water yield. In theory, less water is lost to evapotranspiration from the removed vegetation and this water is available for stream flow and/or additional groundwater storage. It is common in western Oregon for evapotranspiration to be in excess of 25" annually. Site conditions determine how much evapotranspiration will actually occur and depends on slope, aspect, soils, type of vegetation and climatic conditions.

Research has shown a temporary (until re-growth) increase in water yield following harvest in many cases (FEMAT 1993, p. V-20). The largest increases in annual water yield occur in the fall and spring, when maximum differences in water storage exist (Harr, 1976). However, responses have been proportional to the amount of vegetation removed.

Much of the research on the effects of timber harvest on water yield was done by studying the effects of harvesting entire small watersheds and involved treatments that went from ridge top to creek edge. Little research has been done in the Pacific Northwest looking at the effects of partial cuts, thinnings, patch cuts, or the effect of clearcutting while retaining streamside buffers on water yields. In an overview of several studies, Satterlund and Adams (1992, p. 253) found that "lesser or non-significant responses occur ... where partial cutting systems remove only a small portion of the cover at any one time." Where individual trees or small groups of trees are harvested, the remaining trees will generally use any increased soil moisture that becomes available following timber harvest.

Research has also shown that the effects of harvest on annual yield are short-lived. Harr (1979) found that the re-growth of shrubs and small trees commonly returns rates of evapotranspiration to pre-logging levels within about five years, while Keppeler and Ziemer (1990) found that water yields returned to near pre-logging condition within a range of 1-8 years following harvests. Jackson and Haveren (1984) estimated that annual yield would return to pre-harvest levels within 5-15 years in the Coast Range.

Since the proposed thinning involves only partial cutting in about 0.2% of the North Fork Coquille Watershed, about 237 out of 98,500 acres, no measurable increase in water yield is expected as a result of the proposed project. In addition, any potential effects on water yield from the proposed thinning and density management thinning would be reduced gradually over time (5-15 years) as the remaining trees in thinned stands increase their growth rate and uptake of nutrients and water.

(b) Low Flows

Studies have shown that low flows may be affected by timber harvest. One report, which synthesized results from six paired watershed studies, showed that relative increases in summer flows were initially high after harvest but were eliminated within a few years due to re-growth of vegetation (Harr 1983). Another study showed that base flows can actually decrease below pre-harvest levels if more consumptive riparian species occupy near-stream areas (Hicks et al., 1991). This condition may be occurring presently due to the large number of alder and overstocked conditions within many of the previously harvested stands. However, there is no historical data to verify naturally occurring low flow levels.

Low flows may initially increase following thinning in the proposed project area, but the effect is expected to be short lived (5-10 years) and will probably not be measurable. Even so, any increase in low flows would be beneficial to fish during the summer when temperatures are high. One objective of the proposed project is to replace alder, a more consumptive species, with conifer in riparian and adjacent upland areas and this has the potential to increase summer low flows (see page 39: Chapter 4, PROPOSED ACTION, *Alder Conversion*, Stream Flow).

(c) Peak Flows

Following timber harvest, studies have shown that peak flows during fall and spring periods are likely to be increased primarily due to reductions in transpiration and interception losses following harvest (Jackson and Van Haveren 1984). However, fall and spring peak flows are generally considerably smaller than the larger peak flows that typically occur during large storms in winter. The intense rainfall that occurs in winter, when soils may be near saturation, can overwhelm any changes in evapotranspiration due to timber harvest (NFC WA 2001, Ch. 4 p. 9). Rothacher (1973), Harr (1976), Jackson and Haveren (1984), and others found that major high flows were not significantly increased as a result of timber harvest in the low elevation Coast Range.

In summary, peak flows in the low elevation Coast Range are dependant on the intensity and duration of rainfall rather than vegetation manipulation. Also, as noted above, changes in the magnitude and timing of stream flow have been found to be proportional to the amount of vegetation removed. Judging by past research, and the scale and location of the proposed project, no measurable change in peak flows would be expected.

Water Quality

(a) Stream Temperature

Density management thinning in Riparian Reserves has the potential to increase stream temperature by temporarily creating openings in the canopy and reducing shade. Shade from trees near the stream channel is important for reducing direct solar radiation and therefore stream temperatures (see page 24: Chapter 3, Water Quality, Stream

Temperature). However, the proposed project incorporates design features to minimize canopy openings. These design features include no-harvest buffers adjacent to all streams to maintain the canopy directly over channels, retaining a minimum of about 60 trees/acre outside no-harvest buffers and minimizing the number and size of cable yarding corridors. Therefore, the proposed density management thinning would have a negligible effect on stream temperature.

No-harvest buffers would be established for all streams within and adjacent to proposed units. No trees would be harvested that are located within 20 feet of a stream bank, or within 20 feet of an identifiable topographic break near the bank (generally, the top of the inner gorge), within 20 feet of a floodplain, or within 20 feet of the streamside edge of vegetation, whichever is greater. The minimum 20 feet no-harvest area could be expanded on a site-specific basis, if necessary, to provide additional protection in specific areas identified by resource specialists. The no-harvest buffers will maintain existing canopy closure directly over the stream channel.

Cable yarding corridors will be necessary in some of the proposed units to access trees across stream channels. The proposed project is designed to minimize the number and size of these corridors. Skyline corridors would be required to be a maximum of 12 feet wide. The location, number, and width of cable yarding corridors would be specified prior to yarding and natural openings will be used as much as possible. Distance between skyline corridors would be required to be a minimum of 150 apart at the unit edge where feasible. A total of approximately 17 yarding corridors with a maximum of 12 feet in width are planned for over 0.5 miles of stream within the seven project units, which equates to one corridor for every 128 feet of stream. This is well within the Best Management Practices as defined in the Coos Bay District Resource Management Plan (RMP ROD, p. D5).

In general, canopy closure in the thinned areas outside no-harvest buffers would be maintained at 60% or above. This level would help maintain shade height and density. It is estimated that canopy closure would approach pre-thinning density in about 10 years. Thinning would result in favorable height to diameter ratios that would reduce the risk of blowdown (Smith 1962, p. 422), and subsequent exposure of the stream to solar heating. In addition, thinning would encourage establishment of understory trees and shrubs with their associated multi-canopy layers that could provide shade in the event that some or all of the overstory shade is lost due to a catastrophic event (Levno; Rothacher 1969 cited in Adams; Ringer 1994).

(b) Sediment

Some short-term soil displacement and pathways for sediment delivery may occur as a result of localized soil disturbance from felling, yarding, and ground based equipment operations. The no-harvest areas, as described above, are intended to function as stream protection buffers to avoid impacts to aquatic resources from harvest activities. These buffers would assist in maintaining riparian integrity that includes vegetation composition, shading, and bank stability. The no-harvest buffers of a minimum of 20 feet in width will be sufficient to protect stream banks because this is about the maximum distance (half the crown diameter) that adjacent root systems contribute to bank integrity (FEMAT 1993, p. V-26). The no-harvest areas would also provide an adequate filter strip because forest soils in the Pacific Northwest have very high infiltration capacities and are not effective in transporting sediment by rain splash or sheet erosion (Dietrich et. al. 1982).

As described above, the proposed project includes thinning within Riparian Reserves using cable systems. In units where yarding is required through the no-harvest area, logs will be fully suspended to protect stream banks. There should be no increase in sediment delivery if logs are fully suspended above stream channels containing water. Where full suspension is not feasible, operations will occur during the dry season over any streams with visible surface flow. In addition, trees that are felled within the no-harvest buffer to provide yarding corridors will be dropped toward the stream channel to provide bank armoring and coarse woody debris.

Channel Condition and Large Wood

Density Management in Riparian Reserves would increase tree growth rates in the area most likely to contribute large wood to stream channels (FEMAT 1993, pp. V-26&27). Providing large wood to streams is an important component in meeting Aquatic Conservation Strategy objectives. Thinning second growth stands located within the Riparian Reserves ensures greater growth and tree size in a shorter time period than would occur without thinning. Thinning to 120 trees per acre would allow 20+" live trees to be available as large wood for interaction with the streams 10-40 years sooner, depending on site

class. Thinning to the same density would allow 20+" dead trees to be available 40-90 years sooner (NFC WA 2001). Faster growth rates are due to an increase of available light, nutrients and water for the remaining trees. This should allow the trees within the Riparian Reserves to develop at a rate consistent with the thinned upland stands. Restricting thinning of second growth stands in the Riparian Reserves would create a situation where the largest trees are furthest from the stream channel with less chance of interacting with the stream.

Most of the riparian areas in the proposed units have been previously harvested. According to MacDonald (1991, p. 128) "The practice having the most widespread influence on [large wood] in Pacific Northwest streams has been the harvest of trees from riparian areas." The proposed project area, judging from its position in the watershed and present riparian condition, has historically been dependent on large wood to help reduce stream energy, capture substrate, aggrade the stream channel, allow floodplain development and provide aquatic habitat (see fisheries report). Middle Creek, Cherry Creek and other streams in the project area are deficient in large wood and are down-cut to bedrock in several reaches. A lack of large wood and disassociation of the stream from the floodplain have allowed increased stream velocities to continually scour stream channels and remove substrate during high flows.

Large wood recruitment is an integral part of watershed recovery and restoration of aquatic habitat (see fisheries report). Large wood contributed to the channel from Riparian Reserves would provide several benefits to channel function and water quality. Large wood can serve to capture substrate, reduce stream energy, aggrade the stream channel, and re-establish a connection with the floodplain. Aggradation of the channel also has the potential to raise the water table, increase floodplain water storage and increase summer stream flows. Increased summer flows would contribute to lower stream temperatures (see page 24: Chapter 3, Water Quality, Stream Temperature).

Density management thinning in Riparian Reserves would benefit intermittent as well as perennial streams. One purpose of the Riparian Reserves is to maintain the structure and function of intermittent streams (USDA & USDI 1994, p. B-13). As stated in FEMAT (1993, p V-36) "Intermittent streams store sediment and wood and are sources of these materials for permanently flowing streams." Large wood captures and stores sediment and is critical in maintaining step-pool morphology in many small headwater streams. Research showed as much as 15 times the annual sediment yield stored behind wood in Idaho streams and between 100 to 150 years of average annual bedload stored behind wood debris in steep tributary streams in northern California (Megahan 1982; Keller *et al.* 1995, both cited in Curran 1999). A recent study by Curran (1999) found that spill resistance from step-pool reaches contributed 90% of the friction that slows water velocity in some western Washington headwater streams. This has the potential to delay flow from these tributaries during storm events and reduce peak flows downstream.

Some large wood will be immediately available for interaction with streams as a result of the proposed project. Trees felled for skyline cable corridors that are within the no-harvest area would be retained on site for coarse woody material. An additional conifer for approximately every 100 feet of stream channel will be felled from outside of the no-harvest buffers within the Riparian Reserves and would also remain on site.

2. Alder Conversion

Approximately 42 acres of alder would be removed and replanted with conifer species as a result of the proposed project. Alder conversion would occur within the same units as thinning and density management operations. Acres of alder conversion by drainage are listed in the table below. Values are approximate and are based on GIS data.

Location of Alder Conversion Areas by Drainage

Drainage	Total Acres	Conversion Acres	Percent of Drainage Area
Cherry Creek	8,330	30	0.4
Middle Lost	4,150	12	0.3

Stream Flow

Approximately 0.1% of BLM and <0.1% of the entire Watershed would be converted from alder to conifer. The effects of proposed alder conversion on stream flow would be similar to those discussed under density management above. However,

the following differences between treatments would apply. In theory, conversion of alder stands to conifer would increase stream flow in summer since conifers are believed to transpire less water than hardwoods during the summer growing season. A paired watershed study by Hicks et al. (1991) indicated that hardwoods that re-grew in the riparian area after logging used more water in summer than conifers. Examination showed that August flows 3-18 years after harvest were 25% lower than pre-harvest levels. Therefore, it is expected that low flows would be increased when alder is replaced by coniferous species. However, at the scale of the proposed project, the effect would probably not be measurable at the 7th field drainage level.

Water Quality

The effects of proposed alder conversion on water quality would be similar to those discussed under density management above. However, as noted above, conversion of alder to conifer stands has the additional potential to increase summer low flows. Increased stream flow in summer would help reduce stream temperatures during the most critical period, although, changes at the 7th field drainage level would probably not be measurable. In the long term, taller conifers in the riparian area would be more effective than alder in providing shade for wider stream channels and would also help reduce stream temperatures.

The no-harvest buffer width adjacent to streams in red alder conversion units would be adjusted on a site-specific basis. A buffer width necessary to provide adequate stream shading would be determined by resource area staff depending on stream size, aspect, existing vegetation and local topography. The method used would be similar to the system devised by Brown (1973).

Channel Condition and Large Wood

As discussed previously (see page 38: Chapter 4, PROPOSED ACTION, *Commercial Thinning and Density Management*, Channel Condition and Large Wood), large wood is a critical component for stream function and aquatic habitat in the Watershed. Most of the riparian zone surveyed by ODFW in the proposed project area was found to have a lack of large conifers (see page 25 Chapter 3, Hydrologic Condition, Channel Condition and Large Wood) and is dominated by smaller hardwoods. Conversion of alder stands to conifer in riparian and upland areas will create a greater potential for future recruitment of large wood to stream channels.

3. New Road Construction

Approximately 0.6 miles of new road would be constructed to access the proposed units. All of these roads would be located on or near ridge tops. Road construction would incorporate design features to minimize erosion and the capacity to transport sediment. These BMPs (RMP ROD pp. D3-D4) may include but are not limited to construction during the dry season, avoiding fragile or unstable areas, minimizing excavation and height of cuts, end-haul of waste material where appropriate and provision for adequate road drainage. Approximately 0.5 miles of the newly constructed roads will be fully decommissioned when project activities associated with each road are completed. Full decommissioning as defined by the Western Oregon Districts Transportation Management Plan (2001, p. 15) may include but is not limited to subsoiling or tilling, construction of adequate water bars, stabilizing fill areas, revegetation and blocking access with a suitable barrier. Approximately 0.1 miles of the newly constructed roads will be maintained for future use. There will be an overall reduction of 2.7 miles of road as a result of the proposed action (see page 40: Chapter 4, PROPOSED ACTION, *Road Closure/Decommissioning*.

Stream Flow

Roads have the potential to increase peak flows (Beschta 1978, Wemple et al. 1996). Roads with cut-banks have the potential to intercept subsurface water and divert it into the road's drainage network. Roads can serve to extend the drainage network and can increase peak flows by delivering water from their ditch lines to stream channels faster than in a non-roaded landscape.

The proposed new roads would have a negligible effect on flow because they will be designed to stay disconnected from the drainage network, and the roads would be located on or near ridge tops. Ridge top roads have a low potential for diverting flows. The construction practices noted above will encourage any drainage from the road surface to infiltrate into the soil profile and not connect or add to drainage from the existing road system. This will greatly reduce the likelihood of a potential change in the magnitude or timing of stream flow.

Peak flows have also been shown to increase when 12% or more of a watershed is occupied by roads or other compacted surfaces (Harr, 1976). However, existing roads in the Watershed and proposed project area do not approach this level, and the compacted area created by the proposed roads would have a negligible effect on peak flows. Again, these temporary spur roads would be constructed, used for harvest and decommissioned when project activities are completed.

Water Quality

Roads have the potential to increase sediment delivery to stream channels. However, Reid and Dunne (1984) and others found that the amount of sediment produced by a road is highly variable and depends on the location, amount of use, surface type and other factors. They measured 130 times as much sediment coming from a heavily used road compared with an abandoned road, and a paved road yielded less than 1% as much sediment as a heavily used gravel road. It is also important to note that the road drainage network must be connected to a stream channel in order to deliver sediment-laden runoff. Heavily used roads with poor surfaces that are adjacent to a stream channel have the highest capacity to deliver sediment and reduce water quality.

The 0.6 miles of proposed new roads (road table 4b on page 14) are located on or near ridge tops and incorporate design features such as avoiding fragile or unstable areas, minimizing excavation and height of cuts, end haul of waste material where appropriate, and construction during the dry season. The roads will be designed to quickly route surface flow across the road prism, and any potential sediment-laden surface water should quickly infiltrate into forest soils.

All new construction, dirt roads and landings will be seasonally maintained prior to winter rains if they are to be used the following year. Seasonal maintenance may include but is not limited to providing adequate water bars, and mulching, using wood chips or straw and seeding with a district approved erosion control seed mix. The roads should not increase sediment delivery to stream channels and would have little potential to affect water quality.

4. Road Renovation/Improvement

Approximately 5.2 miles of road associated with the proposed project would be renovated and maintained for future use (road table 4c on page 14). BMPs that would be used for the proposed road renovation (RMP ROD, pp. D3-D4) may include but are not limited to surfacing with rock, improving stream crossings, correcting erosion problems from ditch lines and cross drains, restoring outslope or crown sections, and stabilizing cutbanks and fill slopes. These improvements to existing roads would reduce their potential to alter flow magnitude and timing or to deliver sediment to the drainage network.

5. Road Closure/Decommissioning

Approximately 2.7 miles of new and renovated roads would be used and then fully decommissioned at completion of proposed project activities (road table 4e on page 14). Full decommissioning as defined by the Western Oregon Districts Transportation Management Plan (2001, p. 15) may include but is not limited to subsoiling or tilling, construction of adequate water bars, stabilizing fill areas, revegetation and blocking access with a suitable barrier. Decommissioning of these road sections would eliminate the potential to alter flow magnitude and timing and the potential to deliver sediment to the drainage network.

6. Haul Routes

Most of the haul routes are paved, and this virtually eliminates the potential for sediment delivery to streams during transport of logs. Sediment delivery to streams from gravel surface roads would be minimized or eliminated through the use of silt fencing and/or straw bail barriers, removal and relocation of trapped sediment to stable upland areas, gravel lifts to stream crossings and dry season hauling.

Impacts on Aquatic Habitat/Fisheries, Essential Fish Habitat, and T & E Fish Species

NO ACTION ALTERNATIVE

Alder Conversions (Regeneration Harvests)
Under the No Action Alternative, opportunities to convert alder and brush stands to conifer in the GFMA and Riparian Reserves would be delayed or foregone. The alder-dominated Riparian Reserves in the project area typically have an understory of salmonberry. In the long-term, and assuming no disturbance of sufficient intensity to free growing space for conifer species, alder stands like those proposed for conversion with a salmonberry shrub layer can become brushfields (Emmingham; Hibbs 1997, Hemstrom; Logan 1986, Newton; Cole 1994). Tall shrubs in the Coast Range, such as salmonberry, are capable of dominating sites for decades and even centuries (Emmingham et al. 2000). The observed competitiveness of vine maple suggests that alder stands with a vine maple understory could also have a brushfield successional endpoint. In the absence of natural disturbances, the sites which had previously supported a late-successional or old-growth conifer forest are currently not on a trajectory to develop into their historical condition in the short- or long-term without active management.

Commercial Thinning/Density Management
Harvest over the past several decades occurred in anticipation that young conifer plantations would be intensively managed until subsequent regeneration harvest. New habitat objectives require altering stand conditions from those ideal for maximizing wood production, to those suited for maintaining water quality and biological diversity. Under the No Action Alternative, opportunities to manage stand densities in the GFMA and Riparian Reserves would be delayed or foregone. The benefits derived from enhancing the structural characteristics in the project area would not occur and habitat conditions for species associated with late-successional riparian habitats would remain unchanged. This alternative would not accelerate tree growth and enhance potential future large wood accumulations in the Riparian Reserves. A sparse understory would persist in the densely stocked stands until changes occur in the minimally differentiated canopy. A gradual increase in understory diversity and abundance may not occur until 100 or even 200 years of age without intervention.

PROPOSED ACTION

Silvicultural practices such as density management and hardwood conversions are often the most appropriate and cost effective methods for enhancing or restoring desirable habitat conditions in riparian areas. With specific objectives clearly defined, a silvicultural prescription can shift the current riparian forest to a desired future condition (Newton et al. 1996). Thinning and conversions can result in the establishment of large conifers that will provide shade and wood to streams well into the future. When standing, large conifers provide habitat to a wide variety of birds, mammals, insects and invertebrates. When fallen, they continue to provide habitat to terrestrial wildlife species and often benefit aquatic species as well (Maser and Sedell 1994).

Alder Conversions (Regeneration Harvests)
Under the proposed action, alder-dominated stands in both upland (GFMA) and Riparian Reserves would be treated to restore conifer species and facilitate development of large trees, snags, and down logs in areas formerly occupied by large conifers. Restoration of conifers to hardwood-dominated riparian forests in the Oregon Coast Range is crucial to the creation of stream habitat favorable to anadromous salmonids (Emmingham et al. 2000). Conifers provide the large logs necessary for complex stream habitat; these large logs are the key elements in debris jams, which foster the development of pools, accumulation of gravel, hiding cover, and off-channel habitat for fish during high flows (Emmingham et al. 2000).

Although the conversion process curtails the short-term contributions of small non-durable alder wood to the forest floor and nearby streams, the no-harvest buffers would provide wood sources until the alder stands break up at an age of about 90 years. By that time, the planted conifer would be well established and provide durable wood sources in the long-term, although a component of alder would likely remain in close proximity to the stream channels. Small organic input to the streams would be maintained because the hardwood buffers would continue to provide leaf litter and other particulate matter; these beneficial sources of nutrients are generally produced within half a tree height away from stream channels (FEMAT 1993 pg V-26).

Commercial Thinning/Density Management

Under the proposed action, approximately 179 acres of young conifer stands on GFMA lands would be thinned, primarily for wood production objectives, and 58 acres of young conifer stands in Riparian Reserves would be thinned to facilitate development of large conifer trees, snags, and durable down logs. Thinning results in several significant changes in tree structure and vigor; larger stem diameters, longer and wider live crowns, and enhanced tree vigor (Maquire 1996).

The small diameter and high decay rate of woody material recruited from the young conifer stands in the project area provides little in terms of in-stream structure and channel stability that is likely to persist for long periods of time (NFC WA 2001, Appendix: In Stream Large Woody Debris Recruitment Potential, p. 9). After the stands are thinned, the growth rate of individual trees is expected to increase in the long-term (15+ yrs), which would benefit aquatic habitat and channel stability, because larger pieces of woody structure would be available in a shorter period of time than would occur without thinning.

Although the density management thinning projects may somewhat reduce sources of smaller woody debris from small conifer in the short-term because fewer standing trees would remain within a distance of one tree height, the long-term benefits of a better developed understory for at least 20 years and enhanced growth and development of the dominant trees would provide a greater diversity and size of organic material in the long-term (Maas 1995). Felling and leaving one conifer tree per 100' of stream in the Riparian Reserves will increase the amount of woody debris in streamside areas until natural recruitment occurs in the future.

The following project design features would be implemented under the proposed action to protect water quality and maintain or enhance Riparian Reserve.

- Riparian Reserves would be maintained to protect intermittent, fish-bearing, and perennial non fish-bearing streams, as well as potentially unstable areas in accordance with the Coos Bay District RMP ROD (USDI BLM 1995). Although timber harvest designed to restore conifer in alder-dominated stands and density management thinning that would increase the growth of conifer and enhance understory development (Spies et al 1991) would occur within the Riparian Reserves, the retention of protection buffers would further protect water quality, and ensure short- and long-term sources of large conifer to benefit in-stream and riparian functions.
- No new roads would be constructed in Riparian Reserves. Renovation of existing roads would be restricted to the dry season, and culvert replacements to improve road drainage would be implemented in a manner that would minimize or eliminate the potential of sediment delivery to fish-bearing stream reaches (see Hydrology sections above pertaining to water quality).
- Approximately 65 yarding corridors with a maximum width of 12 feet are planned for over 4 miles of stream within the 27 project units, which equates to one corridor for every 128 feet of stream. This is well within the Best Management Practices (BMP's) as defined in the Coos Bay District RMP, which specify that natural openings would be used as much as possible, not more than 250 feet of yarding corridors are allowed within any 1,000 feet of stream, the maximum corridor width would be less than 50 feet, and corridors would be at least 50 feet apart. (RMP ROD, Volume II, p. 73). Full log suspension would be required over streams where feasible. In situations where full-log suspension is not feasible, one-end suspension would be required, and the timing for yarding would be limited to the dry season. In the case of Jerusalem Creek, helicopter yarding would occur in areas that would otherwise require yarding directly through the Riparian Reserve of a fish-bearing stream.
- The no-harvest buffers would be sufficient to maintain bank stability because the contribution of root strength to maintaining streambank integrity declines at a distance of one-half the crown diameter (FEMAT 1993 pg V-26).
- Because small logs contribute to organic matter important in food webs and provide short-term structure in stream and riparian habitats, all trees felled in yarding corridors within the no-harvest buffers would remain on site. An additional conifer for every 100 feet of stream channel would be felled from outside of the no-harvest buffers within the Riparian Reserves, and remain on site.

Road-related work would be scheduled and implemented in a manner to prevent sedimentation that would adversely affect special status fish or their habitat. Road renovations and improvements would be restricted to the dry season, and culverts would only be replaced on small, non fish-bearing streams during low-flow periods. Sediment filters and bypassing surface water during replacement would cause only negligible, if any, increases in sediment delivery and/or stream turbidity in non fish-bearing streams in close proximity to the culverts replaced. Bare soils would be seeded and mulched prior to the rainy season.

As described in the "Impacts to Hydrologic Conditions" section of this EA, water temperatures in streams within or downstream of the unit boundaries would not be affected by the proposed actions. Although density management thinning and logging corridors would result in minor canopy openings in the short-term, the retention buffers and the post-thinning crown closure of a minimum of 60% should not cause temperature impacts: thinning just outside a narrow no-cut buffer of 20-30 feet should have no measurable impact on stream shading (Newton et al. 1996) and keeping stands at densities exceeding 60 trees per acre would assure high percentages of crown cover (Emmingham 1997).

The buffers in the alder conversion units would be prescribed on a site-specific basis to prevent stream temperature increases. The alder remaining along the small stream channels would continue to provide an overstory canopy, and the dense salmonberry and shrub layer in the understory would further shade the small stream channels until restocked conifer become well established in 10-20 years. In a study of the influence of cover and stream features on stream temperatures in western Oregon, densiometer measurements tended to give readings of more than 70% even when buffers for hardwood conversion units were fringes less than 33 feet in width. Even when minor warming trends were observed in harvest units with very narrow tree buffers, the increases were not significantly different from the background temperature increases. Within a short distance downstream, water temperatures merge with those of closed-canopy stands (Zwieniecki and Newton 1999).

The majority of the haul routes from all of the proposed units are paved, and few stream crossings occur along the gravel-surface portions. However, if timber haul occurs during the rainy season (generally mid-October to mid-May), the timber sale contracts would require the purchaser(s) to place sediment filters at locations specified by BLM. Once haul is completed, sediment retained by the filters would be transported to upland locations to prevent subsequent delivery to aquatic resources.

Cumulative Effects
The expected cumulative effects of the proposed action are beneficial overall, and would tend to offset the current homogeneity of the stands proposed for treatment, and benefit EFH in the long-term. Thinning operations would increase tree growth and the diversity of stand characteristics with a trend toward conditions similar to that of naturally regenerated old-growth forests; especially in Riparian Reserves when the upland areas (Matrix) are harvested in the future. The alder conversion projects would restore conifer to locations where it formerly existed, and eventually become late-successional forests in areas not managed for timber production.

Fisheries
Because no detrimental impacts to fish populations or EFH are expected as a result of the proposed action, no negative short-term cumulative effects are anticipated. However, the cumulative effects to fish populations, in-stream habitat, and riparian dependant species that would eventually occur as a result of thinning and conversion would be beneficial for the reasons described above. Based on historical information, considerably greater salmon populations existed in the subwatershed prior to human caused disturbances, and efforts to restore forest and riparian conditions similar to what existed historically, even if only in Riparian Reserves, would likely aid in the recovery of depressed stocks in the long-term.

Consistency with Aquatic Conservation Strategy Objectives

The Aquatic Conservation Strategy (ACS) was developed to restore and maintain the ecological health of watershed and aquatic ecosystems contained within them on public lands. The strategy would protect salmon and steelhead habitat on federal lands managed by the Forest Service and Bureau of Land Management within the range of Pacific Ocean anadromy (NFP S & G's, p. B-9). The appropriate landscape scale for evaluating the consistency of individual and groups of projects with the ACS is the watershed, corresponding with the "fifth-field" hydrologic unit code (HUC) as defined in the "Federal Guide for Ecosystem Analysis at the Watershed Scale"[5]. The proposed projects are all within the North Fork Coquille 5th Field Watershed (HUC# 1710030505).

The intent of the ACS is to maintain and restore aquatic habitats and the watershed functions and processes within the natural disturbance regime by prohibiting activities that retard or prevent attainment of ACS objectives. The primary emphasis of

[5] Reference November 9, 1999 Regional Ecosystem Office memorandum concerning Northwest Forest Plan Requirements for ACS consistency determination.

the Standards and Guidelines for Riparian Reserves is restoration of the ecological processes and stream habitats that support riparian dependant organisms.

This conservation strategy employs several tactics to approach the goal of maintaining the "natural" disturbance regime, but it is not possible to provide for the complete recovery of aquatic systems on federal lands within the range of the northern spotted owl within the next 100 years, and full recovery may take as long as 200 years.

ACS OBJECTIVE 1 - *Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.*

The projects involve commercial thinning and alder conversions on Matrix and Riparian Reserve land use allocations (LUAs). Measures would be taken when implementing the projects to assure the maintenance and restoration of watershed and landscape features as described in the Project Design Features section of this EA. Course wood and snags would be retained in the project units and additional down wood would be provided at yarding corridors and along all stream channels (one tree would be felled for every 100' of stream length within each unit). The increased spacing created by thinning would release minor conifer species, thereby increasing overall stand diversity and providing long-term habitat for riparian and aquatic-dependent species (Tappeiner 1999). The development of larger trees and a diverse understory is expected to provide greater benefits to more species (Chan et al. 1997).

No new road construction would occur within Riparian Reserves. Because many of the newly constructed roads would be temporary, and additional existing roads would be fully decommissioned following project completion, road density in the project area would be decreased in the long-term. The provision of yarding corridors through Riparian Reserves would result in only minor gaps in the overstory canopy and not degrade the Riparian Reserve (i.e. the Riparian Reserve system would continue to provide adequate shade, woody debris recruitment, and habitat protection and connectivity). The design features proposed for the projects are expected to maintain and will not retard or prevent attainment of the elements outlined in ACS objective 1.

ACS OBJECTIVE 2 - *Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.*

No new roads or culverts would obstruct routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species. The density management thinning and alder conversion projects would retain the dominant conifer in both the Riparian Reserves and upland areas, and spatial and temporal connectivity would be maintained (canopy closure post-thinning would be a minimum of 60% in the thinned stands.

The proposed projects would meet the objectives stated in the Coos Bay District Record of Decision and Resource Management Plan of having less than 12% compaction within the harvested areas. Use of ground-based logging systems would be limited to broad, gently sloping upland areas. Some localized soil displacement and soil compaction can be expected, but would not likely affect riparian areas. No net increase in compaction is expected from ground-based logging methods, and the existing condition in regards to compaction would be maintained. No known refugia would be affected by the proposed projects. The proposed action is consistent with and will not retard or prevent attainment of ACS objective 2.

ACS OBJECTIVE 3 - *Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*

In the vicinity of the proposed treatment areas, the physical integrity of the aquatic systems would be maintained by the Riparian Reserve network. Incorporation of design features described above would avoid impacts to stream bank and existing bottom configurations. Where thinning and alder conversions occur within Riparian Reserves, a minimum of 20 foot no-harvest buffers would be maintained along all stream channels, and the trees within the buffers would remain on site. Full suspension of logs would occur over stream channels where possible, and if not, yarding operations would be restricted to the dry seasons.

Ground-based logging systems in the density management thinning stands would occur on broad, gently-sloping ridge tops well outside of riparian areas. The project design features would maintain or improve and will not retard or prevent attainment of the elements outlined in ACS objective 3.

ACS OBJECTIVE 4 - *Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*

The proposed projects are not likely to have a measurable effect on water temperatures or turbidity levels, or result in the release of hazardous materials. The no-harvest buffers, retention of the dominant trees, and post-thinning canopy closure of at least 60% should be sufficient to prevent temperature impacts. Full-log suspension over non-fish bearing streams would prevent damage to stream banks such that no erosion or sedimentation would occur during wet periods of the year. Where full log suspension is not feasible, one-end suspension would be required and yarding would be limited to the dry season.

If haul occurs on gravel-surface roads during the wet seasons, sediment filters would be located to prevent road-generated sediment from entering aquatic habitats. Road related construction and improvement work involving earth-moving equipment would be accomplished during the summer months

Refueling of gas or diesel-powered machinery would not occur in close proximity to stream channels. The contractor would be required to have a hazardous materials action plan to contain and clean up any spills. Mechanisms would be in place to respond quickly to the incident to avoid contamination of a waterway. The design features incorporated with the proposed action are expected to maintain and will not retard or prevent attainment of the elements outlined in ACS objective 4.

ACS OBJECTIVE 5 - *Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*

Implementation of Best Management Practices (RMP ROD) and project design features should prevent any measurable increases in turbidity and fine sediment levels outside of the natural range of variability (see discussion for ACS objective #4 above). Design features would minimize or eliminate road generated sediment delivery to streams along the gravel surface portions of the haul routes. Design features should also prevent sedimentation or turbidity increases that would measurably affect the sediment regime during replacement of culverts on small streams. Portions of the project areas considered at high landslide risk would be protected as part of the Riparian Reserve network, and would not influence the timing, volume, rate or character of landslide events. The elements outlined in ACS objective 5 would be maintained. Implementation of project design features will not retard or prevent attainment of this ACS objective.

ACS OBJECTIVE 6 - *Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.*

The hydrology of the area is driven by precipitation in the form of rain. The area may occasionally receive snow, but the quantity and duration of the snow does not normally produce rain-on-snow events. The projects would affect the hydrology of the streams and tributaries within the project areas for a period of 15-30 years; minor increases in the annual yield, low flows, and the spring and fall peak flows are expected due to the increase in the amount of water available because of the removal of vegetation and the corresponding reduction in evapo-transpiration losses during the spring and fall. However, these increased spring and fall peaks are still considerably smaller than the peaks that typically occur during large winter storms. Therefore, the increase in peak flows would not have a detrimental effect, and increases in annual and low flows may be beneficial because more water would be available during the critical low flow season. Peak, summer, and annual flows are expected to remain within the range of natural variability for these stream types at both the 5th field and site level scales. Implementation of project design features will not retard or prevent attainment of this ACS objective.

ACS OBJECTIVE 7 - *Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.*

The proposed action would maintain the current Riparian Reserve network on federally administered lands. The timing, magnitude, variability and duration of floodplain inundation would be maintained in the short- and long-term at both the site and 5th field watershed scales. Areas that are not currently connected with the floodplain would likely remain disconnected in the short-term and possibly in the long-term. No change in the timing, variability, and duration of floodplain inundation outside the range of natural variability is anticipated (see ACS objective #6). No meadows or wetlands occur within the project units. Implementation of project design features will not retard or prevent attainment of this ACS objective.

ACS OBJECTIVE 8 - *Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.*

The current Riparian Reserve network would be maintained on BLM administered lands. The proposed action would not alter any streamside vegetation that would be expected to influence stream temperature at the site or 5th field watershed scales in the short- or long-term. Thinning in the Riparian Reserves would release minor conifer species, increase overall stand diversity, and provide shading and surface litter. The development of larger trees and a diverse understory is also expected to provide greater benefits to more species. By maintaining the Riparian Reserve network, adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion and bank erosion, channel migration, and coarse woody debris recruitment are expected to be maintained on federal lands. No wetlands occur within the proposed harvest units. Implementation of project design features will not retard or prevent attainment of this ACS objective.

ACS OBJECTIVE 9 - *Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.*

On a broad scale, the NFP provides for the maintenance and restoration of habitat to support well-distributed populations of riparian-dependent species, primarily through the Late-Successional Reserve and Riparian Reserve networks. Other NFP components that further contribute to this goal include designation of Key Watersheds, mitigation measures for Survey and Manage Species, maintaining 15% of all watersheds in late-successional forest condition, retaining 25-30% late-successional forest in Connectivity blocks and retention of northern spotted owl 100 acre core areas and marbled murrelet occupied sites in Matrix lands.

The proposed action would maintain all NFP land use allocations and management standards within the North Fork Coquille River watershed, including the Riparian Reserve network. This would result in the protection of habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species in the short- and long-term. The proposed projects would be consistent with and will not retard or prevent attainment of the elements of ACS objective 9.

Impacts on Wildlife, Including T & E Species

NO ACTION ALTERNATIVE
The proposed action would not result in the removal of suitable habitat for northern spotted owls or marbled murrelets.

PROPOSED ACTION

Impacts to Threatened and Endangered Wildlife Species Occurrence and Habitat
The proposed action would not result in the removal of suitable habitat for northern spotted owls or marbled murrelets.

The habitat within the commercial thinning units is considered dispersal habitat, and the more open stand following thinning would continue to provide dispersal habitat for NSO.

In regard to NSO dispersal, the USFWS Letter of Concurrence (USDI 2002) for this project states:

"The ultimate question is whether or not spotted owls can disperse to Late Successional Reserves (LSRs) or between LSRs in the District. Forsman *et al*, In Press, summarized results of radio telemetry and band recovery data for dispersing juvenile spotted owls in Oregon and Washington (including the Roseburg District of the Bureau of Land Management. The data suggest that spotted owls are able to move between local LSRs and that the LSRs are well connected via dispersal habitat. There were several instances of spotted owls banded in one LSR dispersing to another LSR. Spotted owls appear to be able to move across areas of non-habitat, and even stand < 40 years of age do not appear to inhibit dispersal. Furthermore, independent tests of spotted owl genetics suggest that spotted owl populations are well mixed. Maintaining havens of suitable habitat within the dispersal matrix between LSRs may be of greater importance as dispersing spotted owls still tend to select mature and late-seral forests, but can cross areas of unsuitable habitat (summarized by Thomas *et al*. 1990). Riparian Reserves, spotted owl core areas, murrelet occupied sites, and other Reserve allocations scattered through the Matrix provide these islands of suitable habitat, as do remaining habitat stands in the Matrix. Hardwood conversions do not affect these habitat stands. Consequent, overall, the hardwood conversion projects are not expected to impede spotted owl dispersal. "

The proposed action would have “no effect” on bald eagles because there are no known eagle sites or roosts within 800 meters of any of the proposed units. No known bald eagle nest trees, perch trees, or roost trees would be cut in any of the proposed actions. No suitable habitat for bald eagles would be removed in this action.

Impacts to Other Wildlife and Habitat
Activities involved with the proposed action would cause disturbance to a variety of wildlife species and could affect normal activities and expose individuals to additional risk. The smaller, less mobile species such as mollusks, amphibians, and small mammals, would be particularly vulnerable to adverse effects on a local level, but should not be seriously affected on a population scale.

Yarding of logs across large down logs in advanced states of decay would cause damage to an important habitat feature that would not be replaced in the short term. Some existing snags would also be damaged as a result of the proposed action.

The proposed action would not reduce canopy closure below 60 percent that has been considered the minimum level for red tree voles. Following thinning, the stand is expected to progress to improved red tree vole habitat sooner than would occur if thinning did not occur.

Reports from a large study on the effects of commercially thinned and un-thinned 40 to 55 year old Douglas-fir stands in the Oregon Coast Range indicate that bird detections and bird species richness have increased in thinned stands (Hagar et. al., 1996). Weikel (1997) found that thinning for old-forest characteristics would likely have a positive impact on populations of cavity nesting birds in both the short and long term.

Timber harvest in the proposed areas would decrease the amount of thermal cover and hiding cover for big game species. Thermal cover rejuvenates in approximately 5 to 7 years in a commercially thinned area. Increased understory growth following the proposed action may benefit elk and deer populations. Elk populations are currently at a low to moderate level

with good growth potential. Limiting factors may be forage availability because of reduced timber harvest in the area over the past several years. Deer populations are lower than in the 1970s and 1980s and are stable or slightly decreasing (Toman, pers. comm.).

The commercial thinning would slowly change the designation from a "closed sapling-pole-sawtimber" stand to a "large-sawtimber" stand. The more open crown cover would permit the development of ground vegetation. Many of the same wildlife species would continue to use the stand. Commercial thinning would replace the slower, natural thinning process and would remove many of the trees that would have eventually become small snags and small down woody material. Cavity nesting habitat would not naturally develop, nor would there be an increase in down coarse woody material in the near future because of removal of these trees during the thinning operation. Thinning would reduce the canopy closure for several years and could alter the species composition slightly.

Stand development following the proposed action would provide increased availability of larger trees and improved potential to provide larger snags and coarse woody material in the future.

Cumulative Effects
Cumulative effects of timber harvest at the regional landscape level were analyzed in the NFP FSEIS and mitigation measures have been incorporated into the NFP ROD. The implementation of the proposed action, would be consistent with the Standards and Guidelines set forth in the plan. No additional cumulative effects are expected beyond those previously analyzed.

Impacts on Recreation

NO ACTION ALTERNATIVE

No effects to recreation are anticipated from the No Action Alternative.

PROPOSED ACTION

The proposed McKinley Camp, Coos County's Cherry Creek Park, BLM's Big Tree recreation site, and the Cherry Creek Research Natural Area would not be affected by the proposed project.

Visitor observations by staff and volunteers indicate users are generally local, regional, or return visitors. They are aware of the risks associated with vehicle traffic on single lane roads built for logging,

Impacts to visitor use include possible short delays in travel due to equipment on the roads. The activity and noise associated with logging may encourage some visitors to go elsewhere. New temporary roads may attract short-term use by a few people.

The overall public use of the area is not expected to change.

Impacts on Cultural Resources and Native American Religious Concerns

NO ACTION ALTERNATIVE
No impacts identified.

PROPOSED ACTION
No impacts identified. The lack of recorded cultural resources and relatively recent (30-60 year old) disturbance history produced during previous logging activities indicate intact cultural resources would not be affected by this project. If potential cultural resources are encountered during this project, all work in the vicinity would be stopped and the District Archaeologist would be notified.

Impacts on Air Quality, Forest Fuels and Fire

NO ACTION ALTERNATIVE

Under the No Action Alternative, no direct short-term impacts to the fuels and fuel loadings of the proposed project areas would occur.

An indirect consequence to no action would be resulting stagnant stand conditions with associated mortality over time resulting in a long term build up and accumulation of dead or dying fuels both ground and aerial. This condition could make the stands more susceptible to a damaging stand modifying fire and may hamper fire control efforts during a wildfire event.

PROPOSED ACTION

Under the proposed action, there would be localized short-term increases in volatile fuel loadings and a short term increased risk of wildfire in the proposed project areas. Associated with the proposed action would be increased human activity that would increase the possibility of human caused wildfire; however the contractors associated with the increased activity operate under approved fire prevention plans.

Many existing access roads within the proposed project areas have a history of intensive use by the public for hunting, camping, recreation and special forest product harvest. Much of this activity occurs during peak fire danger periods. Because of this historical activity, road side hazard reduction measures would reduce the hazard along roads within the project area that will remain open after harvest operations are completed that are not identified for closure or decommissioning after harvest operations.

Harvest activities would create openings in the project areas that resemble openings caused by naturally occurring fires that have been excluded from this environment for decades. Thinning dense and stagnating stands would reduce the long-term vulnerability of the stand to the possibility of damaging wildfire by removing or reducing the sources of future fuel loading.

Smoke from prescribed fire activities would contribute to minor short-term increases in particulate matter in the surrounding air shed. All prescribed fire activities would be conducted in compliance with the Oregon Smoke Management Plan, (OAR 629-43-043).

Impacts on Solid and Hazardous Waste

NO ACTION ALTERNATIVE
A hazardous material Level I survey was conducted on the project area. No hazardous material sites were found. There are no known past uses that would indicate a potential problem. This alternative would create no impacts under the Solid and Hazardous Waste theme.

PROPOSED ACTION
The proposed action is subject to applicable provisions for Petroleum Product Precautions under the Oregon Forest Practices Act (reference: OAR 629-57-3600), and Spill Prevention, Control and Countermeasures under Oregon DEQ provisions (reference: OAR 340-108).

No effects are anticipated from the proposed action, unless a release of hazardous materials occurs as a result of operations. Depending upon the substance, amount, and environmental conditions in the area affected by a release, the impacts could range from short term to more extensive and longer lasting. Minor amounts (less than 2 gallons) of diesel fuel, gasoline or hydraulic fluid leaking from heavy equipment onto a road surface, with little or no chance of migrating to surface or ground water before absorption or evaporation, would be an example of minimal impact.

If a petroleum substance is released at or above the State of Oregon reportable quantity of 42 gallons, or has the likelihood of reaching ground or surface water regardless of amount, it could cause more serious impacts to the environment. This impact could range from localized contamination of soil and vegetation, to entry into surface water and toxic effects upon fisheries

and aquatic life habitat. The greater the quantity of material released, the more the effects are likely to be, coupled with variable pathway conditions such as seasonal water levels, flow velocity, and rainfall.

Human health is not likely to be at risk under the proposed alternative.

Access road or skid trail closures will diminish the future potential for illegal dumping of solid and hazardous waste along roadsides and in riparian areas.

Impacts on Energy Exploration, Development, and Transportation

NO ACTION ALTERNATIVE
There are no road closures associated with this alternative. Energy development will remain unchanged from its current condition.

PROPOSED ACTION
Decommissioned roads that may later be needed for energy exploration, development or transportation can be reopened for energy exploration. The roads would be closed, not obliterated.
This alternative would not impact energy access, exploration, development, transportation, and/or production.

Chapter 5 - List of Agencies and Individuals Contacted

The general public was notified of the planned EA through the publication of Coos Bay District's semi-annual *Planning Update*.

Eleven adjacent landowners were contacted during the scoping process.

The following public agencies and interested parties were notified with e-mail scoping letters:

Coast Range Association
Oregon Natural Resources Council
Wildlife Management Institute
Division of Land Conservation and Development
Confederated tribes of Coos,Lower Umpqua, and Siuslaw Indians
Hugh Kern
Umpqua Watersheds
Pam Hewitt, (Many Rivers Group)
Division of State Lands
Sierra Club, Many Rivers Group

The following public agencies and interested parties were notified with hard copy scoping letters:

NOAA National Marine Fisheries Service
Southern Oregon Timber Industry Association
Klamath-Siskiyou Wildland Center
Bonneville Power Administration
USDI Bureau of Indian Affairs
Association of O&C Counties
Kalmiopsis Audubon Society (2 interested parties)
Georgia Pacific dba The Timber Company
John Muir Project
Rogue Forest Protection Agency
Lacie Phillabaum
Cindy Soderholm
Donald Fortenot
John Griffith
Coquille Indian Tribe

The proposed project was reviewed by the U.S. Fish and Wildlife Service through the consultation process provided under section 7(A)(4) of the Endangered species Act of 1973. Written concurrence (#1-15-01-I-278)(USDI USFWS 2002) on the proposed projects on “effects determination for re-initiation consultation for not likely to adversely affect actions” was received on April 5, 2002.

Literature Cited:

Adams, P.W.; Ringer, J.O. 1994. *The Effects o f Timber Harvesting & Forest Roads on Water Quantity & Quality in the Pacific Northwest: Summary & Annotated Bibliography*. For. Eng. Dept., Ore. St. Univ.147 pg.

Bailey, J.D.; Tappeiner J.C. *1998. Effects of thinning on structural development in 40 - to 100 year-old Douglas-fir stands in western Oregon.* Forest Ecology and Management 108 (1998) 100

Beschta, R. L. 1978. Long-term Patterns of Sediment Production Following Road Construction and Logging in the Oregon Coast Range. Water Resources Research 14-6: pp 1011-1016.

Bosch, J.M.; Hewlett, J.D. 1982. *A Review of Catchment Experiments to Determine the Effects of Vegetation Changes on Water Yield and Evapotranspiration.* J. of Hydrology 55:3-23.

Brown, G.W. 1973. Buffer Strips for Stream Temperature Control. Forest Research Laboratory, School of Forestry, Oregon State University. Corvallis, Oregon

Brown, G.W. 1983. *Forestry and Water Quality*. College of Forestry, Oregon State Univ., Corvallis.

Brown, E.R. 1985. Management of wildlife and fisheries habitats in forests of western Oregon and Washington. Publ. No. R6-F&WL-192-1985. United States Department of Agriculture, Forest Service, Pacific Northwest Region, Portland, OR. 332 pg.

Chan et al. 1997. *The role of silviculture in the active management of riparian zone vegetation in the Oregon Coast Range: a partnership between researchers and managers.*

Curran, Janet H. 1999. Hydraulics of Large Woody Debris in Step-Pool Streams, Cascade Range, Washington. Masters Thesis. Colorado State University

Dietrich, W. E., T. Dunne, N. F. Humphrey, and L. M. Reid. 1982. Construction of Sediment Budgets for Drainage Basins in Sediment Budgets and Routing in Forested Drainage Basins. USFS General Technical Report PNW-141.

Emmingham, B. 1997. *Growth and yield. Thinning westside forests: stand development, Density Relationships and Management Objectives*. Adaptive COPE.

Emmingham, B.; Hibbs, D. 1997. *Riparian Area Silviculture in Western Oregon: Research Results and Perspectives*, 1996. Cope Report 10(1&2)

Emmingham, WH. SS Chan, D Mikowski, PW Owston, and B Bishaw 2000 *Silviculture Practices for Riparian Forests in the Oregon Coast Range*, Research Contribution 24, Forest Research Laboratory, Oregon State University, Corvallis. 34 pgs.

(FEMAT) USDA Forest Service, USDC National Oceanic and Atmospheric Administration, USDC National Marine Fisheries Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service, USDI National Park Service, and Environmental Protection Agency. 1993. Forest Ecosystem Management: An Ecological, Economic, and Social Assessment. Report of the Forest Ecosystem Management Team.

Fowell, HA; *Silvics of Forest Trees of the United States,* Agriculture Handbook No. 271, 1965 U.S Dept. of Agriculture, Forest Service, pg. 83-87

Franklin, JF.; F. Hall; W. Laudenslayer; C. Maser; J. Nunan; J. Poppino: CJ. Ralph; T. Spies 1986. *Interim Definitions for Old-Growth Doulgas-fir and Mixed Conifer Forest in the Pacific Northwest and California.* Res Note PNW-447. USDA,FS,PNW Exp Stat. 7 pgs.

Froehlich, H.A.; McNabb, D.H.; Gaweda, F. 1982. *Average Annual Precipitation, 1960-1982 in Southwest Oregon*. EM82:20. Extension Service, Ore State Univ, Corvallis.

Furnish, J. 1997. *Management Direction on Federal Lands.* USDA Forest Service, Siuslaw National Forest, Corvallis, OR.

Goheen, D. 2000. *Insect Assessment, Camas Creek LSR Density Management Project.* Memo to Jim Kowalick of the Coos Bay District from USDA-USFS, Southwest Oregon Forest Insect and Disease Service Center.

Hagar, J.C., W.C. McComb, and W.H. Emmingham. 1996. Bird communities in commercially thinned and unthinned Douglas-fir stands of western Oregon. Wildlife Society Bulletin. Volume 24(2). pg. 353-366.

Harr, R.D. 1976. *Forest Practices and Streamflows in Western Oregon*. USDA, FS Gen Tech Rept PNW-49. PNW Res. Sta., Portland OR.

Harr, R.D., R. L. Fredriksen, and J. Rothacher. 1979. Changes in streamflow following timber harvest in soutwestern Oregon. USDA Forest Service. RES. Pap. PNW-249

Harr, R. D. 1983. Potential For Augmenting Water Yield Through Forest Practices in Western Washington and Western Oregon. Water Resources Bulletin 19(3):383-393.

Harr, R. D., and B. A. Coffin. 1992. Influence of Timber Harvest on Rain-On-Snow Runoff: A Mechanism for Cumulative Watershed Effects. American Institute of Hydrology. Pp. 455-469.

Hayes, J.P.,Chan, S.S., Emmingham W.H., Tappeiner J.C., Kellogg, L.D. Bailey, J.D. August 1997. *Wildlife Response of Thinning Young Forests in the Pacific Northwest.* Journal of Forestry. Vol. 95 No. 8, pg. 28-34.

Hemstrom, M.A.; Logan, S.E. 1986. *Plant Association and Management Guide-Siuslaw National Forest*. USDA For. Serv. R6-Ecol 220-1986a. PNW Region, Portland, OR. 121 p.

Hessburg, P.F; Goheen, D. J; Bega, R.V. Revised 1995. *Black Stain Root Disease in Conifers*. Forest Insect and Disease Leaflet 145. USDA-USFS, 11 pgs.

Hicks, B. J., R. L. Beschta and R. D. Harr. 1991. Long-term changes in streamflow following logging in western Oregon and associated fisheries implications. Water Resource Bull. 27(2):217-225.

Jackson, W.L.; Van Havern, B.P. 1984. *Rainfall-runoff Prediction and Effects of Logging: the Oregon Coast Range*. USDI-BLM. Denver Service Center, Denver, CO.

Jensen, EC; Anderson, DJ.; Zasada, JC.; Tappeiner II, JC.; May 1995, *The Reproductive Ecology of Broadleaved Trees and Shrubs: Salmonberry Rubus spectabilis Pursh.* Research Contribution 9e, Forest Research Laboratory, Oregon State University 7 pgs.

Keim, R.F.; A.E. Skaugset; D.S. Bateman. 2000. *Dynamics of coarse woody debris placed in three Oregon streams.* Forest Science 46(1): 13-22.

Keppeler, E.T., and R.R. Ziemer. 1990. Logging Effects of Streamflow: Water Yield and Summer Low Flows at Caspar Creek in Northwestern California. Water Resources Research, 26(7): 1669-1679

MacDonald, L. H. 1991. Monitoring Guidelines to Evaluate Effects of Forestry Activities on Streams in the Pacific Northwest and Alaska. U.S. Environmental Protection Agency, Region 10. Seattle. Pg 139.

Maquire, D. 1996. *Commercial thinning and tree growth*. OSU Forest Resources Dept., Corvallis, OR.

Miner, R., J. Buckhouse, and M. Borman. 1996. The Water Quality Limited Stream Segments list– What does it mean? Oregon State University Extension Service. Corvallis.

Moore, J.A., and J.R. Miner. 1997. Stream Temperatures, Some Basic Considerations. Oregon State University Extension Service. Corvallis, Oregon.

Niemiec, S.S.; Ahrens, G.R.; Willits, S; Hibbs, D.E. 1995. *Hardwoods of the Pacific Northwest*. For. Res. Lab., Ore St. Univ., Corvallis. Research Contribution 8. 115 pgs.

Newton, M.; E. Cole. 1987. *A Sustained-Yield Scheme for Old-Growth Douglas-fir*. Western Journal of Applied Forestry. 2(1):22-25.

Newton, M, R Willis, J Walsh, E Cole, and S Chan. 1996. *Enhancing riparian habitat for fish, wildlife, and timber in managed forests.* Weed Technology 10: 429-438.

Newton, M; Cole, E; 1994. *Stand Development and Successional Implications: Pure and Mixed Stands*. in The Biology of Alder, editors: DE Hibbs; DS DeBell; RF Tarrant. OSU Press, Corvallis, OR. pp. 106-115.

(NFC WA) USDI BLM 2001. *North Fork Coquille Watershed Analysis*, 2nd Iteration, on file Coos Bay District, North Bend, OR.

(NFP FSEIS) USDA-USDI 1994. *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Related Species Within the Range of the Northen Spotted Owl*. United States Department of Agriculture, Forest Service, United States Department of the Interior, Bureau of Land Management. 1994 Portland, Oregon.

(NFP ROD). USDA-USDI 1994. *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl.*. United States Department of Agriculture, Forest Service, United States Department of the Interior, Bureau of Land Management. 1994 Portland, Oregon.

(NFP S & G's). USDA-USDI 1994. *Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl.* United States Department of Agriculture, Forest Service, United States Department of the Interior, Bureau of Land Management. 1994 Portland, Oregon.

Oliver, C.D.; Larson, B.C. 1990. *Forest Stand Dynamics*. McGraw-Hill, NY.

(ODEQ)Oregon Department of Environmental Quality. 1988. *1988 Oregon Statewide Assessment of Nonppoint Sources of Water Pollution*. 319 Report, Planning and Monitoring Section, Water Quality Division, ODEQ, Portland, OR.

(ODEQ) Oregon Department of Environmental Quality. 1998. Oregon's Final 1998 Water Quality Limited Streams-303(d) List.

(ODFW)Oregon Department of Fish and Wildlife. 1999. Aquatic Inventory Project, Training Materials and Methods For Stream Habitat Surveys. Portland, Oregon

(ODFW)Oregon Department of Fish and Wildlife. 2001. Aquatic Inventory Project GIS data. From the ODFW website at <http://www.orst.edu/Dept/ODFW/freshwater/inventory/gis.html

Peet, R.K.; Christensen, N.L. 1987. *Competition and Tree Death*. BioScience 37(8):586-595.

Reid, L. M. 1981. Sediment Production from Gravel-Surfaced Forest Roads, Clearwater Basin, Washington. Fisheries Research Institute. College of Fisheries, University of Washington. Seattle, Washington. FRI-UW-8108.

Reid, L. M., and T. Dunne. 1984. Sediment Production From Forest Road Surfaces. Water Resources Research 20-11: pp 1753-1761.

(RMP FEIS) USDI BLM 1994. *Final Coos Bay District Proposed Resource Management Plan Environmental Impact Statement*. United States Department of the Interior, Bureau of Land Management, Coos Bay District, North Bend, OR.

(RMP ROD) USDI BLM 1995. *Coos Bay District Record of Decision and Resource Management Plan*. United States Department of the Interior, Bureau of Land Management, Coos Bay District, North Bend, OR.

Rothacher, J. 1973. USDA Forest Service Research Paper PNW-163. PNW Research Station. Portland, Oregon.

Satterlund, Donald R., and Paul W. Adams. 1992. *Wildland Watershed Management*, second edition. John Wiley & Sons, Inc. New York.

(S&M ROD and S&G) USDA-USDI 2001. *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines.* United States Department of Agriculture, Forest Service, United States Department of the Interior, Bureau of Land Management. 2001 Portland, Oregon.

Smith, D. M. 1962. *The Practice of Silviculture. John Wiley & Sons, Inc. New York*

Spies, Tappeiner, Pojar and Coates 1991. *Trends in ecosystem management at the stand level.* Transcripts from the 56th North American Wildlife & Natural Resources Conference, p. 32.

Tappeiner, John C. 1999. Thinning young stands and biological diversity. Forest and rangeland ecosystem science center. OSU Corvallis, OR.

Tappeiner, J., D. Huffman, D. Marshall, T. Spies, and J.D. Bailey. 1997. *Density, ages and growth rates in old-growth and young growth forests in coastal Oregon*. Canadian Journal of Forest Research 27:638-648.

Toman, J., Wildlife Biologist, Oregon Department of Fish and Wildlife, Charleston, OR.

Townsend, M.A.; Pomerening, J.A.; Thomas, B.R. 1977. *Soil Inventory of the Coos Bay District*. USDI BLM Coos Bay Dist, Coos Bay, OR 259 pgs + attached maps.

USDI BLM 1998. *Riparian Area Management* - A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas. Denver, Colorado.

USDI. BLM 2002. *Western Oregon Districts Transportation Management Plan* Coos Bay District Office, North Bend, OR. 29pp. Appendix.

USDI USFWS 2002. Letter of Concurrence #1-15-01-I-278. United States Department of the Interior, Fish and Wildlife Service, Oregon State Office, Portland, OR.

USGS 1990. Statistical Summaries of Streamflow Data in Oregon: Volume 1– Monthly and Annual Streamflow, and Flow-Duration Values. United States Geological Survey. Open-File Report 90-118. Portland, Oregon.

Weikel, J.M. and J.P. Hayes. 1997. *Habitat use by cavity-nesting birds in young commercially thinned and unthinned forests.* Coastal Oregon Productivity Enhancement Program. COPE Report. Volume 10(3). Hatfield Marine Science Center. Oregon State University, Newport, OR. 12 pg.

Wemple, Beverley C., J. A. Jones, and G. E. Grant, 1996. Channel Network Extension by Logging Roads in Two Basins, Western Cascades, Oregon. Water Resources Bulletin, Vol. 32, No. 6.

Weirman, CA.; Oliver CD.; 1979. *Crown Stratification by Species in Even-aged Mixed Stands of Douglas-fir - Western Hemlock.* Can. J. For. Res. 9:1-9.

Wilson, JS.; Oliver, CD. 2000. *Stability and density management in Douglas-fir plantations.* Can J. For. Res. 30 910-920

Zwieniecki and Newton 1999. *Influence of streamside cover and stream features on temperature trends in forested streams of western Oregon.* Western Journal of Applied Forestry, Vol. 14, No. 2, April 1999.

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Appendix I - Tables

Table A - Areas considered for treatment, but deferred or dropped from proposal

Twp, Rgn, Sec.	OI# or subdivsion	Reason
27-11-9	OI # 241165	not well stocked
27-11-16	OI # 241473	not well stocked, in some areas trees are too young
27-11-13	OI # 243197	too young and wide spaced
27-11-21	SE portion	too old to thin - good regeneration unit for future
28-11-5	N. 120 acres	too young and/or wide spaced
27-11-5	SE1/4SW1/4	too old, not well stocked, marginal thinning w/ only helicopter access
27-11-5	W1/2SW1/4	leased by County for potential future park development
27-11-33	OI#241520	too young and already widely spaced

Table B - Fish Distribution in the Middle Creek Analysis Area

Sale Name	Township/Range	Sec.	Unit No.	Fish Distribution
Old Man's Road CT	T. 27 S.R. 11 W.	13	1	Coho salmon, steelhead trout, resident cutthroat trout, chinook salmon, and perhaps anadromous forms of cutthroat trout occur in Middle Creek approximately ¼ mile to the north and in Cherry Creek approximately **a** mile to the south.
		13	2	Coho salmon, steelhead trout and resident cutthroat trout occur in Cherry Creek less than ¼ mile to the south.
Cherry Creek CT	T. 27 S.R. 11 W.	23,26	2	Coho salmon, steelhead trout and resident cutthroat trout occur in Cherry Creek approximately ¼ mile to the west and ¼ mile to the south in Little Cherry Creek.
		25	3	Coho salmon, steelhead trout and resident cutthroat trout occur in Cherry Creek approximately ¾ mile to the west and in Little Cherry Creek approximately ½ mile to the south.
		23	7	Coho salmon, steelhead trout, resident cutthroat trout, and perhaps chinook and anadromous cutthroat trout occur in Cherry Creek less than ¼ mile from south boundary.
Cherry 27 CT	T. 27 S.R. 11 W.	27	3	Coho salmon, steelhead trout, resident cutthroat trout, and perhaps chinook and anadromous cutthroat trout occur in Cherry Creek approximately ¼ mile to the east.
			5	Coho salmon, steelhead trout, resident cutthroat trout, and perhaps chinook and anadromous cutthroat trout occur in Cherry Creek approximately ¼ mile to the east.

Table C - Seasonal Restrictions

SEASONAL OPERATING RESTRICTIONS (wildlife restrictions are based on disturbance only, no suitable habitat removal)
DTR = Daily Timing Restriction: work would occur no earlier than 2 hours after sunrise and no later than 2 hours before sunset. Restrictions are mandatory unless stated otherwise.

Activity	Reasons for Restriction	Unit or road work affected	Dates Restrictions in Effect	Dates Restrictions in Effect											
				J	F	M	A	M	J	J	A	S	O	N	D
Road renovation, improvement, construction	Erosion Sedimentation	Road work with exposed soil	Rainy season, generally Oct. 15 - June1	>	>	>	>	31					15	>	>
Conventional tree falling	Tree bark damage	All units	April 1 thru June 30				1	>	30						
Cut-to-length harvester and forwarder	Tree bark damage.	Old Man's Road 1,2.	April 1 thru June 30				1	>	30						
Cut-to-length harvester and forwarder	Potential soil damage in rainy season	Old Man's Road 1,2	Soil moisture exceeds 25% plastic limit	Primarily rainy season, depending on soil moisture											
Cable yarding	Tree bark damage	All cable units	April 1 thru June 30				1	>	30						
Cable yarding	Stream bank damage	Units without full log suspension across live streams	Oct. 16 thru May 31	1	>	>	>	31					16	>	31
Hauling on dirt roads	Potential road surface damage in rainy season	All units with dirt surface haul roads	Oct. 16 thru June 30	1	>	>	>	>	30				16	>	31
Tree falling, Yarding, Snag/CWD creation, In-stream projects	NSO nest or activity center within 0.25 mile of project	Cherry Creek 3A	No activity March 1 thru June 30			1	>	>	30						
			Extend thru Sept 30 if late nesting							>	>	30			
Tree falling, Yarding, Snag/CWD creation, In-stream projects	Unsurveyed suitable MAMU habitat within 0.25 mile of unit	Old Man 1,2 Cherry Cr. 2,3A,7	No activity April 1 thru Aug. 6, then apply DTR until Sept. 16				1	>	>	>	6				

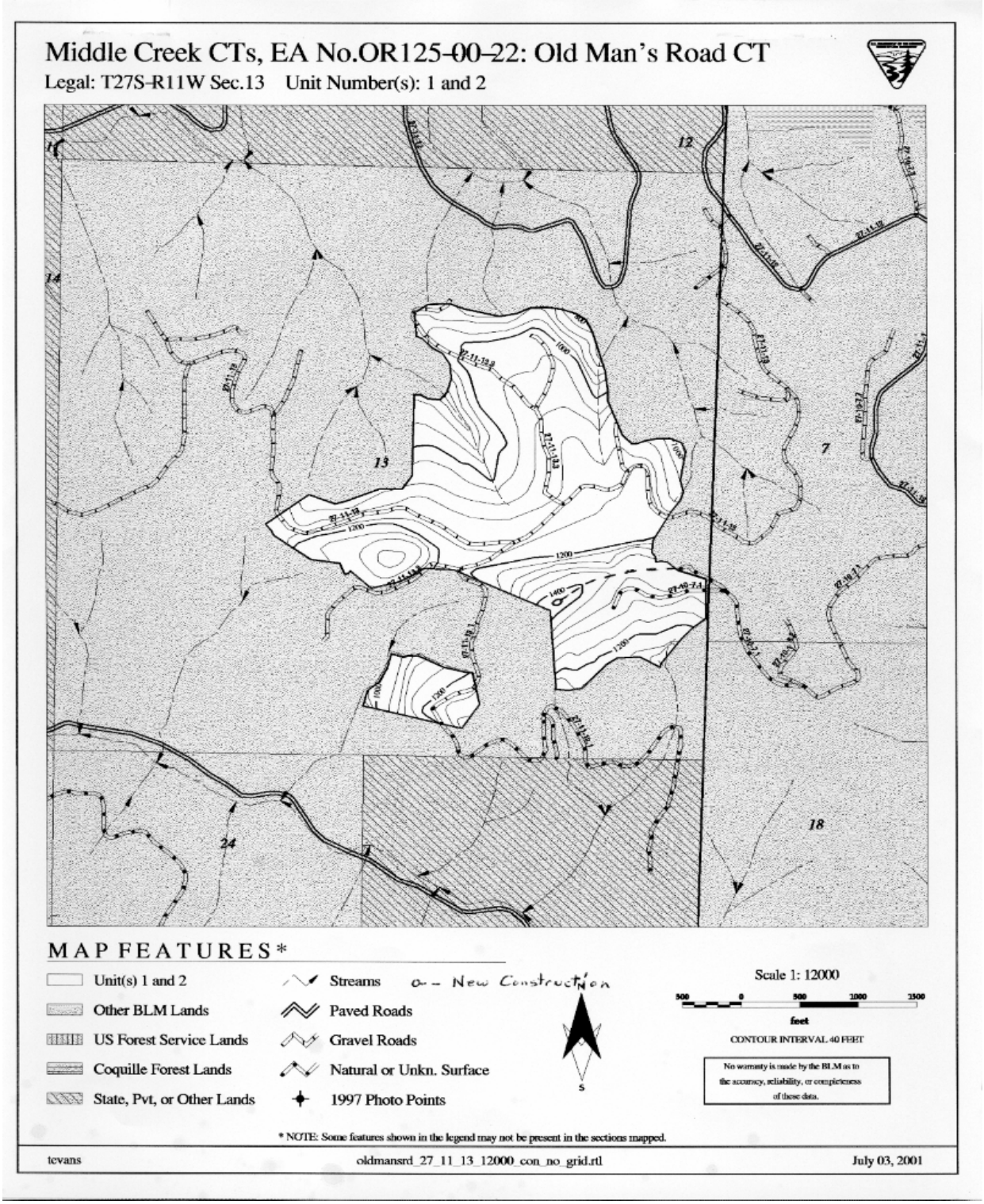
Activity	Reasons for Restriction	Unit or road work affected	Dates Restrictions in Effect	Dates Restrictions in Effect											
				J	F	M	A	M	J	J	A	S	O	N	D
Tree falling, Yarding, Snag/CWD creation, In-stream projects	Occupied MAMU habitat within 0.25 mile of unit	Cherry Cr. 2,3A	No activity April 1 thru Aug. 6, then apply DTR until Sept. 16				1	>	>	>	6				
Road construction Road renovation Road decom (does not include blasting)	NSO nest or activity center within 0.25 mile of unit	Cherry Creek 3A	No activity March 1thru June 30. (Recommended restriction)			1	>	>	30						
Road construction Road renovation Road decom (does not include blasting)	Occupied MAMU habitat within 0.25 mile of unit	Cherry Ck. 2,3A	From April 1 thru Aug 5 apply DTR. (Recommended restriction)				1	>	>	>	5				
Helicopter use (does not include burning)	NSO nest or activity center within 0.5 mile of unit.	Old Man 1,2 Cherry Ck. 2,3A,7	No flights over/near nest stand Mar. 1 thru June 30 at a minimum[1]			1	>	>	30						
Helicopter use (does not include burning)	Occupied or un-surveyed suitable MAMU habitat within 0.5 mile of unit.	Cherry Ck. 2,3A,7l Cherry 27 CT 3,5	No flights over habitat April 1 thru Aug. 5, then apply DTR thru Sept. 15				1	>	>	>	5				
Blasting (road or quarry work. Habitat creation work)	NSO nest or activity center within 1.0 mile of project	Old Man 1,2 Cherry Ck. 2,3A,7,	No activity Mar. 1 thru Sept. 30			1	>	>	>	>	>	30			
Blasting (road or quarry work. Habitat creation work)	Un-surveyed MAMU habitat within 1.0 mile of unit	Old Man 1,2 Cherry Ck. 2,3A,7 Cherry 27 CT 3,5	No activity April 1 thru Aug. 5, then apply DTR thru Sept. 15				1	>	>	>	5				

[1] Restriction may be extended to September 30 based on site specific conditions

Activity	Reasons for Restriction	Unit or road work affected	Dates Restrictions in Effect	Dates Restrictions in Effect											
				J	F	M	A	M	J	J	A	S	O	N	D
Blasting (road or quarry work. Habitat creation work)	Occupied MAMU habitat within 1.0 mile of unit	Cherry Ck. 2,3A,7 Cherry 27 all	No activity April 1 thru Sept. 15				1	>	>	>	>	15			
Burning Site prep	NSO nest or activity center within 0.25 mile of unit	Cherry Ck 3A	No activity Mar. 1 thru June 30. (Recommended restriction)			1	>	>	30						
Burning Site prep	Occupied MAMU habitat within 1.0 mile of unit	Cherry Ck 2,3A,7, Cherry 27 CT 3,5	From April 1 thru Aug 5 applyDTR (Recommended restriction)				1	>	>	>	5				
All Potentially Disturbing Activities	Bald Eagle active nests, roosts or habitual perches within 400m or 800m line-of- sight of unit	NA	From Jan 1 thru Aug 31 for nests and perches[2] November 15 thru Mar 15 for roosts	1	>	>	>	>	>	>	31				

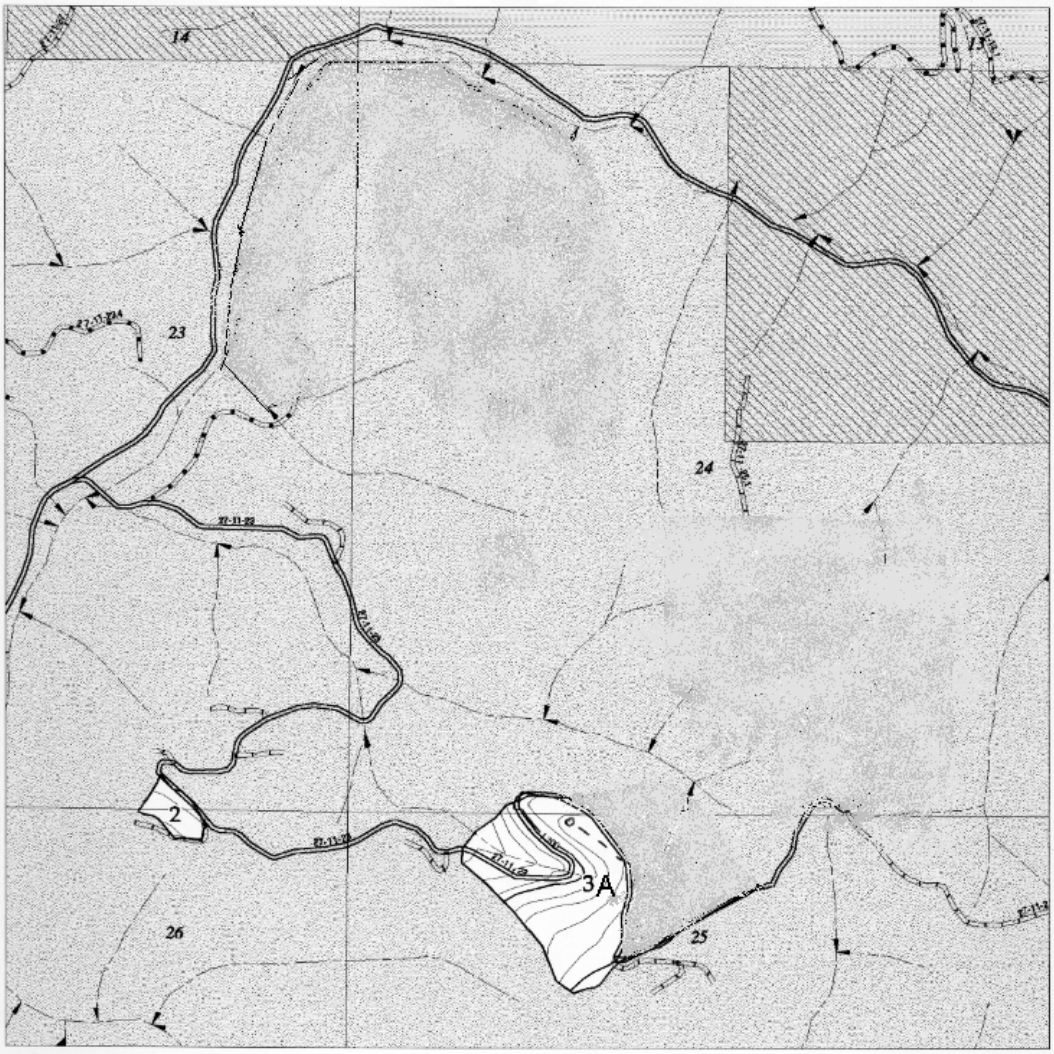
[2] No known eagle nest trees, perch trees, roost trees, or potential perch snags may be cut within 500 m of nests or roosts, no suitable habitat may be cut within 400 m of nests or roosts.

Appendix II - Proposed Project Area Maps



Middle Creek CTs, EA No. OR125-00-22: Cherry Creek CT

Legal: T27S-R11W Sec.24 Unit Number(s): 2,3A



MAP FEATURES*

- Unit(s) 1,2,3,4
- Other BLM Lands
- US Forest Service Lands
- Coquille Forest Lands
- State, Pvt, or Other Lands
- Streams
- Paved Roads
- Gravel Roads
- Natural or Unkn. Surface
- 1997 Photo Points
- o-- New Construction

N

S

Scale 1: 12000

500 0 500 1000 1500

feet

CONTOUR INTERVAL 40 FEET

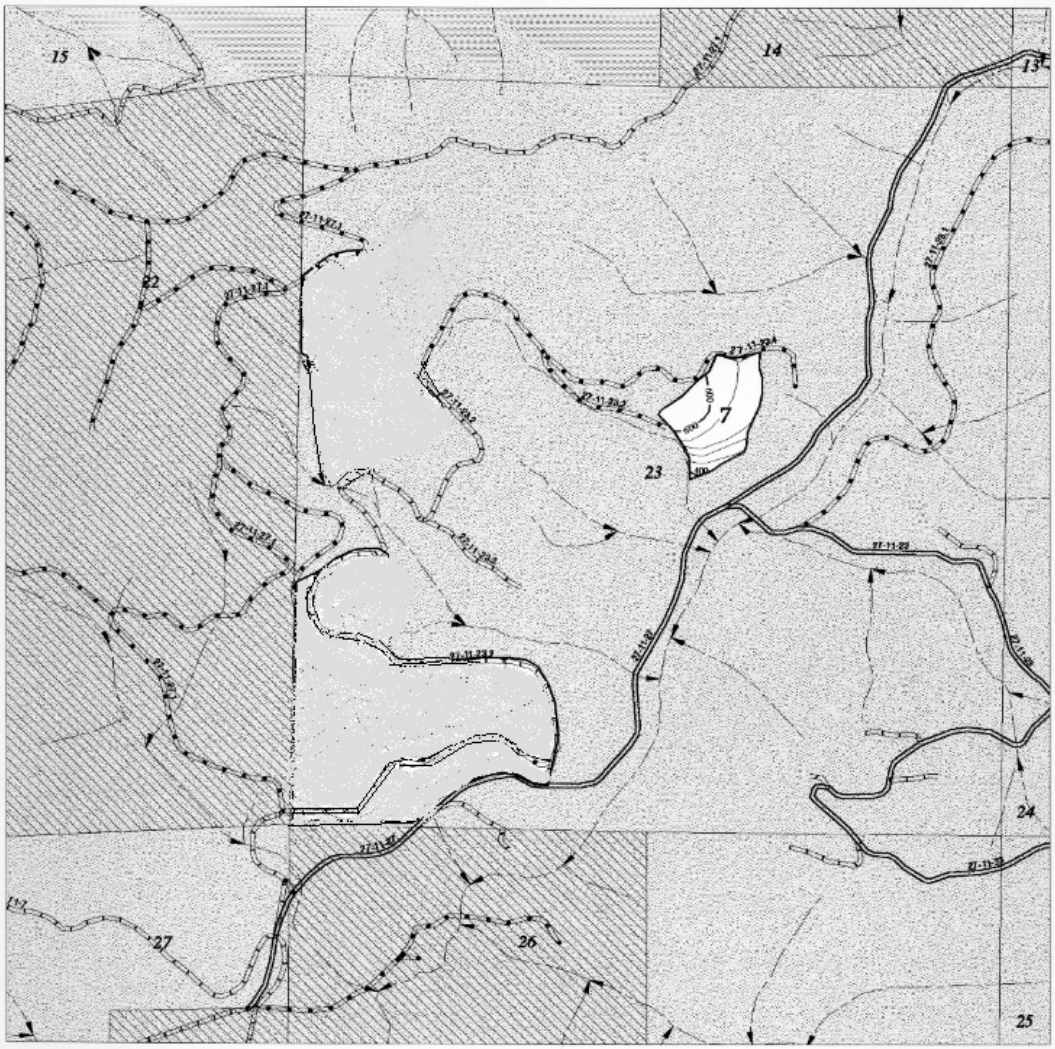
No warranty is made by the BLM as to the accuracy, reliability, or completeness of these data.

* NOTE: Some features shown in the legend may not be present in the sections mapped.

tevans cherryck1234_27_11_24_12000_con_no_grid.rtl July 03, 2001

Middle Creek CTs, EA No. OR125-00-22: Cherry Creek CT

Legal: T27S-R11W Sec.23 Unit Number(s): 7



MAP FEATURES *

- Unit(s) 5,6,7
- Other BLM Lands
- US Forest Service Lands
- Coquille Forest Lands
- State, Pvt, or Other Lands
- Streams
- Paved Roads
- Gravel Roads
- Natural or Unkn. Surface
- 1997 Photo Points
- o-- New Construction

N

S

Scale 1: 12000

500 0 500 1000 1500

feet

CONTOUR INTERVAL 40 FEET

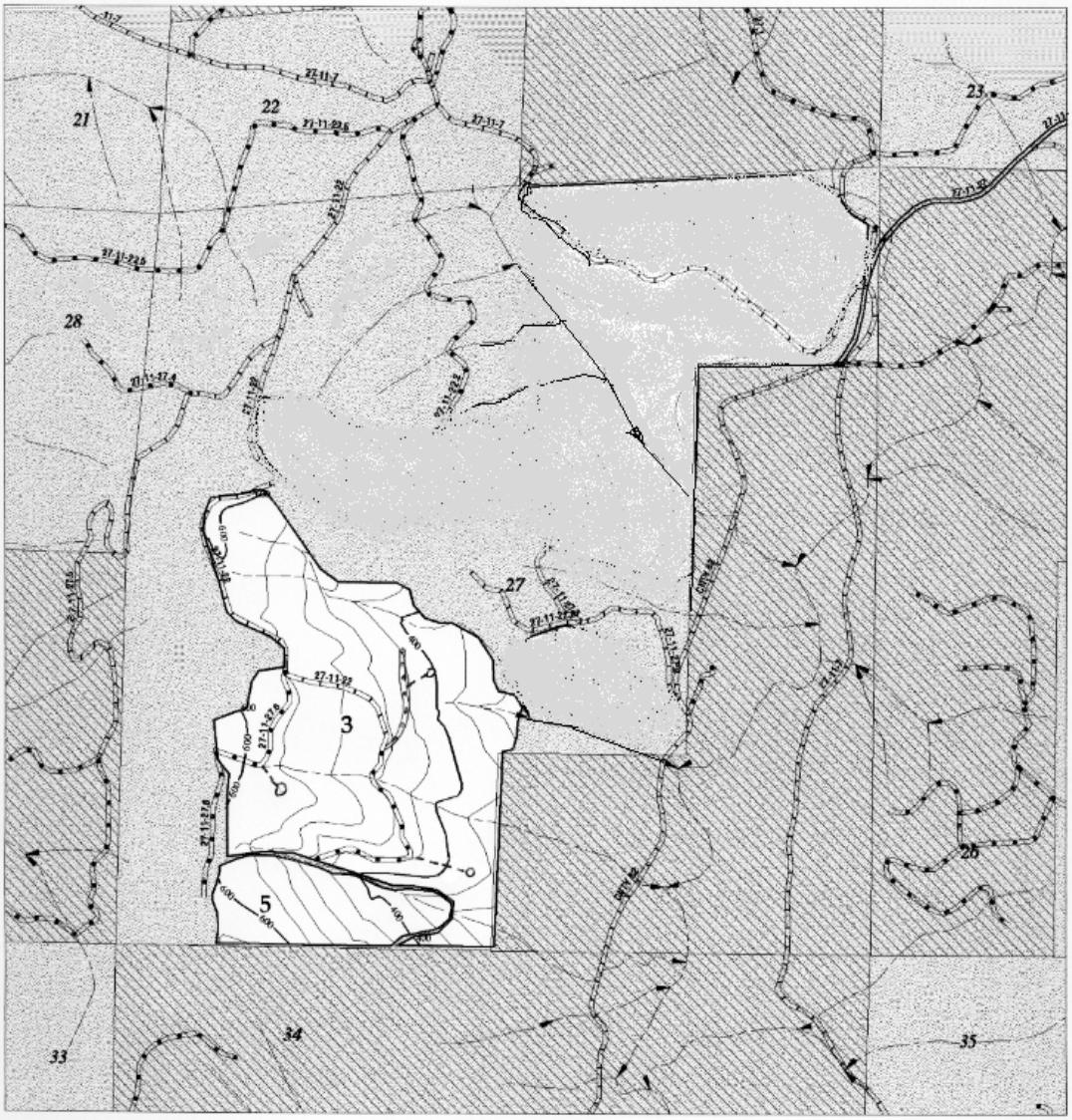
No warranty is made by the BLM as to the accuracy, reliability, or completeness of these data.

* NOTE: Some features shown in the legend may not be present in the sections mapped.

tevans cherryck567_27_11_23_12000_con_no_grid.rtl July 03, 2001

Middle Creek CTs, EA No. OR125-00-22: Cherry 27 CT

Legal: T27S-R11W Sec.27 Unit Number(s): 3,5



MAP FEATURES*

- Unit(s) 1,2,3,4,5
- Other BLM Lands
- US Forest Service Lands
- Coquille Forest Lands
- State, Pvt, or Other Lands
- Streams
- Paved Roads
- Gravel Roads
- Natural or Unkn. Surface
- 1997 Photo Points
- New Construction

* NOTE: Some features shown in the legend may not be present in the sections mapped.

N

S

Scale 1: 12000

500 0 500 1000 1500

feet

CONTOUR INTERVAL 40 FEET

No warranty is made by the BLM as to the accuracy, reliability, or completeness of these data.

tevans cherry2712345_27_11_27_12000_con_no_grid.rtl July 03, 2001